Telephony.

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A Broad View.

Some attention is usually paid to the general manager of a twelve million dollar corporation when he talks at home. And the kind of man who can run a big public service corporation in the city of Philadelphia is worth listening to wherever he speaks. This week a man who is both is talking to a large audience; even though it is scattered pretty much over the globe. But we think it will be an attentive one. If it only knew how hard it is to make one of these twelve million dollar general managers talk for publication—and that one Mr. C. E. Wilson, general manager of the Keystone—then there would be some excitement, we assure you.

But this talk is a co-operative proposition—we asked for it on behalf of our readers, and put it strong. And we got it, straight. It is a coincidence that on another page we print the Keystone company's most recent financial statement. It shows what the contributor of this week's leading article has been doing at home. Work of this kind does not leave much time for words—hence the front page full of ideas—something worth thinking about. Show it to your friends and ask them what they think!

Litigation Requires Speed.

Although by no means a final holding, the judicial opinion rendered in the U. S. Circuit Court at New York this week, which allows the dismissal of two men indicted for alleged attempts to monopolize the sugar business, is interesting. In effect it says that even if an attempt at monopoly is criminal, action must be begun within three years. As long as anti-monopoly suits are under way in the telephone business, there will be an unsettling condition, and it is to the interest of all concerned to push them forward rapidly to conclusion.

Courtesy, Tolerance, Help.

The art of getting along with people is a valuable aid to man in every line of business. Its absence often prevents a man's success in spite of many other good qualities. It seems to be natural to some, but by proper observation, study and practice can be acquired by all.

By what means is it done? Much of it is due to personality. But if we examine closely into the details which bear on this subject, we shall discover some leading characteristics which have a powerful effect.

To get along smoothly with others is not the object of life. It is a means to the true end. The art about which we are talking is founded on ultimate truth and right. It recognizes the basic fact that all of us are imperfect, likely to err, likely to misunderstand and be misunderstood. It also assures that there is something good in every man, which may be utilized if properly drawn out.

Consequently, it is a good rule to look for the best in others. If you are too suspicious of them, they will be distrustful of you. The practice of courtesy and tolerance, and the giving of help will bridge many a gap.

Courtesy is not merely the etiquette of polite society—it is to give the other fellow his chance to act the man, to draw out his better nature.

Tolerance is not agreeing with everybody on every subject—it is merely acknowledging the fact that you do not know it all, and perhaps the other man may be right.

Help does not consist in condescendingly showing your friend how much you know and how little he is—it is banishing such thoughts as these and modestly allowing him to draw on you for such as you possess.

These go to make up the oil of life, which make its machinery run smoothly. Needless irritation and anger fritter away man's energy, and it is worth while to avoid arousing useless ill-feelings in our fellow beings.

Bargain Sale of Monopoly by Maine Politicians.

To the Bell Telephone Company legal difficulties that surround its efforts to maintain and extend its would-be monopolistic character are nothing. It will surmount, if it cannot penetrate, the barriers of the law. Its latest exhibition of this proclivity has occurred in the state of Maine, where it is reported that the New England Telephone and Telegraph Company has bought the release of the Northeastern Telephone Company from the forfeiture clauses in its franchises, the purpose of which were to prevent it from selling out to any competitor. The company is said to have paid the City of Lewiston about $10,000 for a release from this clause, and the city of Auburn, for the same purpose, about $6,000; its next move will undoubtedly be to get a release from Portland and South Portland as cheaply as possible. This action has been made necessary by the absorption of the Northeastern Telephone Company by the New England Tel. & Tel. Co.

From the point of view of the people of the cities involved, these deals are certainly reprehensible. The conduit system in any of the places mentioned is worth many times the price of the release. So the New England company is not only getting something for nothing, but the public in the cities are losing what is most valuable to them, viz. freedom of competition in the telephone business. It will not be surprising if suit is brought on behalf of the public to set aside the purchased releases from the restrictions of the franchises, because the legality of a transaction by which competition is stifled is always doubtful.

Checking Up Trouble in Groups.

The work of correcting irregularities in telephone apparatus is an exceedingly important one. Good service demands few troubles, and the quick repair of those which do occur.

Many people treat each trouble separately, as if it had no relation to any other. In many cases this is wise. But a careful inspection of the trouble sheet will usually show the predominance of one or two classes of defects. This is not a mere coincidence. The same cause which produced a certain effect in a certain piece of apparatus is likely to be at work elsewhere. If allowed to continue, the apparatus will get more and more out of adjustment until the switchboard men have a race merely to keep up with the troubles.

It is one of the objects of the maintenance department to catch trouble before it occurs. It helps to make a fine record and a satisfied public.

This view of the matter has given rise to the following method, which is strongly recommended. Let the man in charge look over the trouble sheet daily and note the trend of affairs. After clearing the reported cases, let all hands be put to work checking up any particular adjustment which a week's reports have shown to be in abnormally bad condition. If a number of pivots show up tight, inspect all like pivots and readjust carefully to perfect action and proper margin. Perhaps a slow, creeping change is going on in the apparatus, and prompt action will keep it in perfect order.

This often means considerable work at the start, but if persistently followed the troubles will decrease as the effect of readjustment begins to be felt. By this means a large number of troubles can be headed off, and the service benefitted.

A Suggestion for Manufacturers.

Automobile owners may in the future learn to carry portable telephones, with some kind of a fish pole arrangement for connecting to lines. Some time ago one of TELEPHONY's staff was out automobiling when the machine ran into the ditch. All in the party escaped unhurt, but the auto was badly damaged. It was necessary to walk several miles before aid could be secured. Being in the telephone business and seeing telephone wires running along the road, the thought occured to TELEPHONY's representative that it would be a good plan to equip automobiles with telephone sets, and the necessary apparatus for connecting with the rural lines.

This seems to be a field which has not as yet been entered to any extent by telephone manufacturers, although it would appear to be a profitable one.

The following clipping from an Atlanta, Ga., paper shows that in special cases automobiles have been equipped with such sets:

"The Selden Car Company, of Georgia, has sold to Evelyn Harris, of the Southern Bell Telephone & Telegraph Company, a Selden five-passenger car, which has been entered in the New York to Atlanta endurance contest.

"This car will be equipped with all necessary telephone apparatus to accommodate those entering the contest. Quick connection can be made from any point by special apparatus, and any of those enroute may talk to parties at home or elsewhere over long-distance.

"The great convenience of this enterprise must be plain to all. In case of a break-down, accident or any urgent necessity for communication with other points, connection can be made in a few minutes from any point."

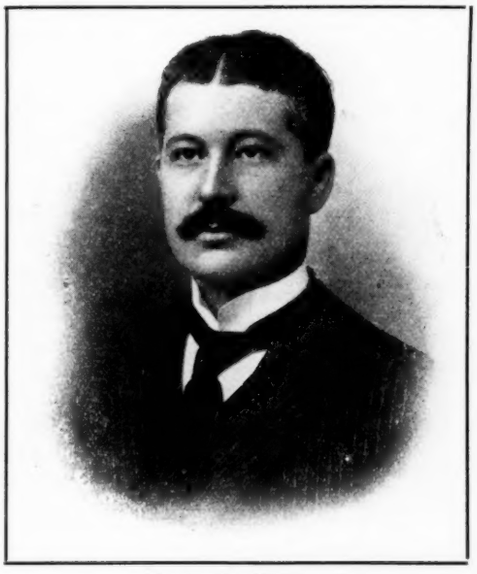
The Situation

A Letter Outlining Some Views of the Writer on Modern Tendencies and the Outlook in the Independent Telephone Business—The Hoggish Promoter and His Bell Accomplices—Present Stability and Local Conditions

By C. E. Wilson

Some of the men who are working hardest to build up the Independent telephone business are sticking so close to the job that only their intimate friends know what they are up to. So far as the outside world can tell, their whole lives are centered in making this or that company do, each year, a little better in one way or another. The results of these efforts may be known to telephone men the country over. But it is the plan applied to start things moving, and, back of this, the shrewd observation, and logical reasoning, which are the elements of one man's success that help others along the road.

The country has just recovered from a business panic. The telephone industry, like all other enterprises, is getting up speed. There never was a time when it was more important for a man to see how things are heading—get his neighbor's viewpoint—and in every other way scan the lessons of the past before taking up the active future ahead. Co-operation, on an honest basis of give and take, in information as in material values, will be the means of building up the industry to greater magnitude and utility.



Mr. C. E. Wilson.

Mr. C. E. Wilson, general manager of the Keystone Telephone Co., of Philadelphia, was asked to give the readers of TELEPHONY some of his ideas on the present condition of the Independent telephone industry—the trend of development—its worth to the investor—and tell what the Keystone company is doing. Here is the reply:

Philadelphia, Oct. 18, 1909.

To the Editor of TELEPHONY:

Dear Sir:—

Replying to yours of the 15th inst., I wish to say that the future of the Independent telephone interests has never looked more promising than it does at the present time. Many of the small companies have amalgamated, thereby reducing expenses and improving their service. Where we had eighty companies at one time in Pennsylvania, we now have about five. These larger companies are managed by competent people and are working in close harmony.

The day of the "wild-cat" promoter is about over in the telephone business. A few years ago, the promoter was abroad in the land organizing companies and agreeing to any proposition that seemed to appeal to the community, accepting limited franchises, limited both as to time and rates, without regard to the future or earning capacity, his only object being to get as many securities for his own services as possible, and to dispose of them as quickly as possible. Many of these companies were eventually compelled to have their securities scaled down. Legitimate Independents were in many cases compelled to buy these plants against their will. This may appear to many of your readers as though I were corroborating the arguments of the common enemy, *but they* (the Bell interests) *are the very people that made this condition possible*, because the promoter knew that after his plant had been built up to a certain point, he could go to the legitimate Independents and offer the property for sale, with the threat that if they did not purchase at his price, it would be offered to the enemy, who in most cases were willing to purchase the properties at more than they were worth, and more than the Independents would pay for them, thereby encouraging the promoter to go into another part of the country and do the same thing over again. The Bell company has suffered far greater losses by this operation than the Independents, because the Independent plants which they have purchased have so often been reproduced. As instances of this, I might mention Detroit, Toledo, and Bucks county, Penn. These are only a few of the cases, however. Baltimore is another notable case where the promoters unloaded on the enemy. The Pittsburgh & Allegheny Company barely escaped the same fate. It is safe to say that their experience in Detroit and Toledo will be duplicated in Baltimore. These operations cause some slight inconvenience to the Independent conecting companies for the time being, but every time the Bell interests buy out one of these plants, they are adding to their already heavy capitalization, and are only temporarily relieved from the competition which they fear to meet on legitimate business lines.

In regard to the Independent telephone business as an investment, it is just as safe and sound as any business I know of, providing the same amount of energy and skill is devoted to it, and a man or set of men who fail in the Independent telephone business would fail in any other business. Until the enemy has a monopoly of brains and capital, they will never have a monopoly of the telephone business; the public demands competition as was instanced in Rochester recently, when 75 per cent of all of the subscribers petitioned the city council to allow the Independent company to increase its rates. These subscribers must have realized that they were getting more than they were paying for.

As far as our own company, and the companies controlled by us are concerned, we are entirely satisfied. We are earning practically twice our fixed charges. There has not been a year since we have been in business that we have not shown a substantial increase in earnings over the previous year, and there has not been a month when we have not shown a substantial increase in net earnings over the corresponding month of the previous year, and this, in spite of the fact that we are carrying an investment of approximately $2,000,000 in a conduit system over and above what we need, for our own requirements, and from which, at present, we are deriving no revenue.

Yours very truly, (Signed) C. E. Wilson.

Notes on the Exploring Coil

By Bruce V. Hill

While the exploring coil has been employed in electrical testing for a long time, it is just coming into somewhat general use for locating faults in cables. An exploring coil is simply a loop, of one or more turns of wire, used in series with a galvanometer or a telephone receiver to explore a magnetic field. The field of a motor or generator is studied in this way. The sources of inductive disturbances on telephone lines may sometimes be sought in the same manner. The earth-inductor, used in laboratories to measure the intensity of the earth's magnetic field is similar in principle to the exploring coil. The exploring coil may be considered simply as the secondary of an induction coil of which the faulty conductors form the primary.

Any conductor, carrying a current, is surrounded by a field of magnetic force. Stated in other words, a magnet, brought near a live conductor, will be acted upon by it. The space through which this action is felt is called the field of the conductor.

Take first a single long wire, with the return circuit so far away that it will not affect a magnet, say a small compass needle, brought near the wire in question. The compass will try to set itself at right angles to the wire. The field of the earth will prevent its doing so completely. Every magnet must have two poles. If one could have simply a positive, or north-pointing pole, and bring it near the live conductor, it would travel in a circle about the latter. Looking along the wire in

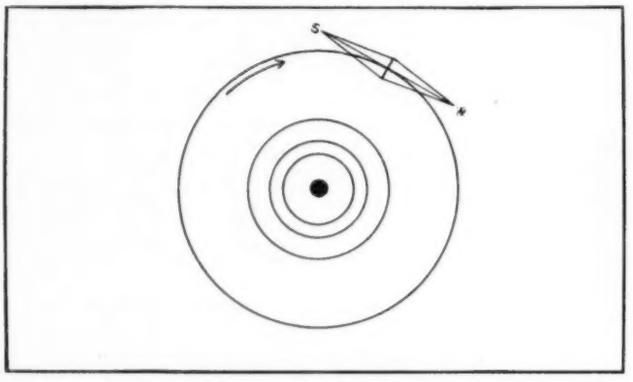


Fig. 1.—Magnetic Field About a Single Wire with Current Flowing Into the Page.

the direction of the current, one would see the positive pole circle about the wire in a right-handed direction.

We say then that the lines of magnetic force circle in a right-handed direction about the conductor carrying the current. Since every magnet has a negative as well as a positive pole, it will not move at all as a whole, but will take up a position such that the line between the two poles will be tangent to the line of force through the center of the magnet. In Fig. 1, the full circle in the center represents the cross-section of the wire of which we have been speaking. The current is supposed to be flowing from the reader into the page. The lines of force are circles, as shown in the figure. The intensity of this force, acting upon the compass needle, would be twice as great on the second circle from the outside of the figure as on the first, where the needle is represented. It would be three times as great on the third circle and four times as great on the fourth or inner circle.

If, instead of a single long wire, there are two parallel wires with currents in opposite directions, the magnetic field will be as shown in Fig. 2. This figure represents the cross-section of a cable sheath with two of the conductors inside of the sheath and two of the lines of force about each wire. The exploring coil lying at the side of the cable may be forgotten for the time. The cable sheath would not affect the shape of the lines of force, though it would reduce the intensity of the tone in the exploring coil by the eddy currents in the sheath. The lines of force are no longer circles, and the conductors are not

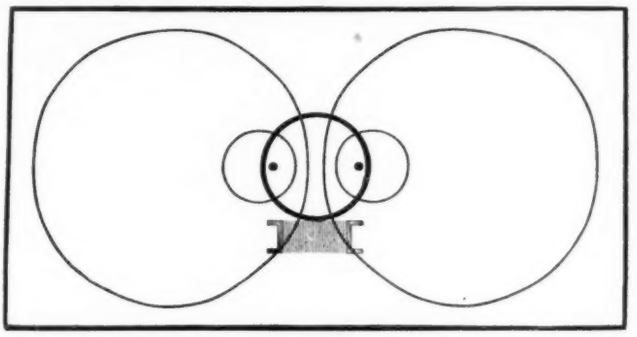


Fig. 2.—Cross-Section of Cable and Exploring Coil and Magnetic Field About Two Conductors Carrying Current in Opposite Directions.

at the center of the lines. Only four lines are drawn, but the space about the wires is really full of them. If the current is changed, the lines of force will change, and if the lines of force are changed the current will change. Imagine a second circuit by the side of the first. Any change in the current in the first will change the lines of force about it, and, since these lines also go through the second circuit, will induce a current in this second circuit. An exploring coil lying against the cable is such a secondary circuit.

If, as in Fig. 3, two conductors are crossed in a cable and an alternating current, or tone, is put upon these conductors, the current passes out over one wire, across the fault, and back on the other wire. If the exploring coil, in series with a receiver, is run over the cable, the tone will be heard until the fault is passed. The greater the distance between the wires which are crossed, the louder will be the sound from the exploring coil. A "short" in a pair of conductors can be found sometimes if everything is still, but this is generally impossible. A ground, in which case the sheath is acting as the return, causes the tone to come up nicely.

In case two pairs are split, as in Fig. 4, and the tone put on conductors 2 and 4 and these conductors tied at the further end, the tone will decrease abruptly at the point where the split occurs, due to the fact that the wires are twisted together beyond this point.

Shape of the Coil.—With a given number of turns of wire about the core of the exploring coil the electromotive force

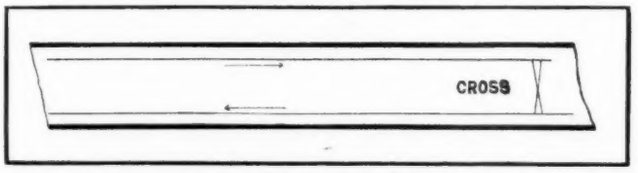


Fig. 3.—A "Cross" in a Cable.

(or voltage) induced in the coil will be greater the larger the cross-section of the core. It will also be greater the less the magnetic resistance of the core. The total lengths of the two lines of force drawn in each side of Fig. 2 are as 29.0 and 7.9 Of the 29.0, 3.6 is within the cable sheath and 25.4 without. Of the 7.9, 2.8 is within the sheath and 5.1 without. The resist-

ance of the part of the path of a line of force through the iron is so small in comparison to the resistance of the rest of the path that it can be neglected. Suppose, then, that the core of the coil be made of such a shape that the magnetic circuit will be as nearly closed as possible, as in Fig. 5. The exploring coil would then reduce the resistance of the path of the two

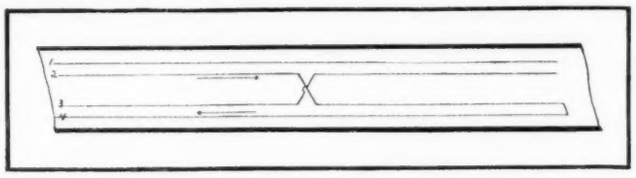


Fig. 4.—A Split Pair in a Telephone Cable.

magnetic lines drawn here to about one-eighth and one-third respectively. As an average, say that the magnetic resistance is reduced to about one-fifth. A coil must be made to be used on large cables as well as on small ones. If the coil has a rectangular section, like that represented in Figs. 2 and 7, the magnetic resistance will be five times as great as with a coil having a core like that in Fig. 5, if the areas are the same. It can easily be given ten times the area of the latter, however, without making it too heavy or unwieldy and it is still twice as effective as the form in Fig. 5.

Position of the Coil in Use.—If one is dealing with a cross or a split, the wires within the cable may be located as in Fig. 6, *A* or *B*. If as 6*A*, the best position of the flat coil will be as in Fig. 7; if as in 6*B*, the best position of the flat coil will be as in Fig. 2. In any case the twist of the whole core of the cable will have to be followed, as can easily be seen from the figures.

Use of Laminated Iron.—If any piece of metal is put into an alternating magnetic field, currents are induced by it. These are called eddy-currents, because they eddy or circle about in the metal. If the core of an exploring coil is made of a solid piece of iron these currents can flow about the whole core. If the core is made of thin strips of iron, whose sides are insulated on account of the coating of oxide, the generation of eddy currents will be greatly hindered. All of the energy of these eddy currents is lost, just as if some of the turns of the coil were short-circuited, and so does not strengthen the tone in the receiver. The amount of energy thus lost is inversely as the square of the thickness of the iron strips. In other

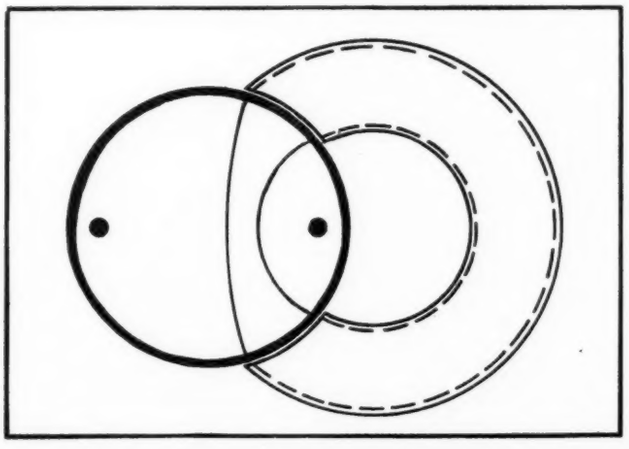


Fig. 5.—Cable and Closed Circuit Exploring Coil.

words, if the strips are made twice as thick, the loss will be four times as great. A coil was made on a wooden frame having a solid core interchangeable with a laminated core. The current through the coil and a receiver in series, induced by a turn of wire about the coil and carrying an alternating current, was measured. The measurements were made with a sensitive galvanometer and a crystal rectifier. This rectifier is described in the Physical Review for March, 1909. The connections used need not be described here. The current was 40 per cent greater than with the laminated core, other things rmaining the same.

Number of Turns.—In dealing with such apparatus as this the mistake is often made of considering only the resistance, while the inductance, or chocking effect, may be greater than the resistance. If two similar coils have ten and one hundred turns respectively, the resistance of the second will be ten times that of the first, while the inductance will be one hundred times that of the first. In other words, the resistance varies as the number of turns and the inductance as the square of that number. If the coil be placed near a circuit carrying an alternating current, as in locating a fault, the electromotive force will increase as the number of turns on the coil is increased. The choking effect increases still faster, however, so that there will be a point beyond which the addition of more turns of wire will render the coil less sensitive. It will be necessary to apply a little mathematics to study the effect of the number of turns on the efficiency of a coil of a given form. The loudness of the tone in the receiver will be greater, the greater the current through it and the exploring coil in series. Ordinarily

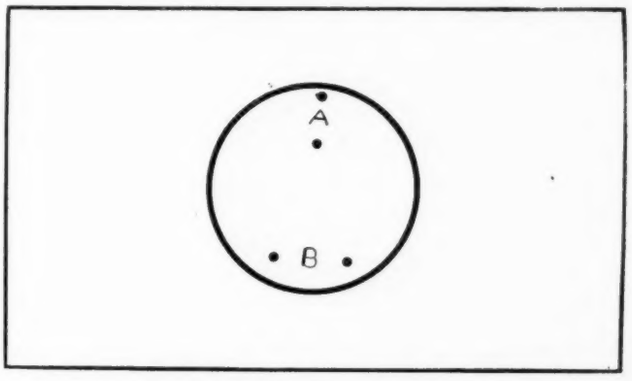


Fig. 6.—Cable and Faulty Wires in Two Best Positions.

a given type of receiver will be available and the coil will be made to best fit this receiver.

Now put the principles just stated in the form of an equation.

Let n = the number of turns; r = the resistance of one turn; z = the inductance due to one turn; e = the E. M. F. due to one turn; R = the resistance of the receiver; Z = the inductance of the receiver; f = the frequency of thte "tone"; $\omega = 2\pi f$.

Then

$$\frac{en}{\sqrt{\omega^2(z^2n+Z)^2+(rn+R)^2}} = I, \text{ the current in the circuit.}$$

Put $I/e = F$.

$$\frac{n}{\sqrt{\omega^2(z^2n+Z)^2+(rn+R)^2}} = F. \qquad (1).$$

Differentiate with respect to n, put $dF/dn = 0$ and reduce and we have

$$n^4 - \frac{rRn}{\omega^2z^2} - \frac{\omega^2Z^2+R^2}{\omega^2z^2} = 0. \qquad (2)$$

Values were substituted in this equation for a given coil and receiver with a sixty cycle current. Of the four solutions of the equation (2), two are imaginary and one negative, so that there is but one physically possible solution. This is, $n = 1270$. The graph of equation (1) as well as the curve obtained by plotting the actual currents observed with given numbers of turns against the numbers of turns, is shown in Fig. 8. The agreement between the calculated and observed curves is very good and the points of maximum current coincide exactly.

Since the absolute value of e was not known, it was assumed so that the observed and calculated maxima would be represented by the same ordinate.

Frequency of the Tone to Be Used.—The electromotive force induced is proportional to the frequency of the inducing current. As has been seen from equation (1) above, the number of

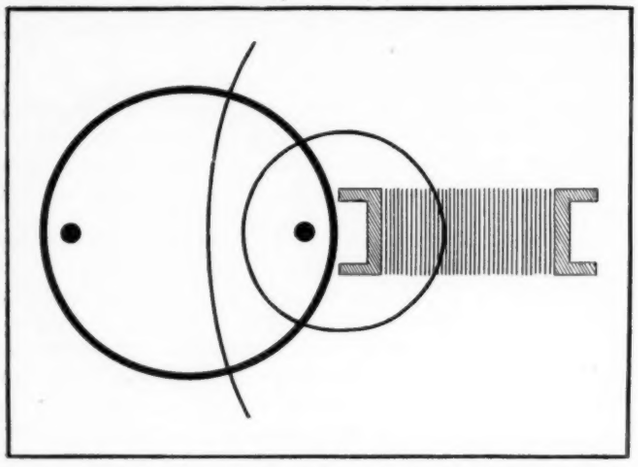


Fig. 7.—Best Positions for Exploring Coil for Testing Wires Indicated by Black Circles.

turns giving the maximum effect is much less with a high frequency than with a low. The ear is more sensitive to the higher tones. On the other hand, the high tone will cause greater disturbance on the good lines in a cable than the low pitch as the impedance offered by the capacity of the cable is less for the high frequency.

When the Exploring Coil is Useful.—When, for example, two lines are crossed, and a tone put upon them, current will go out over one line, across the fault, and back over the other. It will also go from one wire to the other along the whole length of the cable, due to the capacity of the cable. If, therefore, the resistance of the fault is very high, the current crossing over the whole length of the cable will compare in intensity with that crossing the fault, and there will be no point where the tone will vanish sharply but it will fade out gradually. About 30 per cent of ordinary faults can be located with the exploring coil.

An Expert Salesman's Classification of Workers.

Mr. Charles W. Preston, of the Sheldon School of Salesmanship, Chicago, in an interesting address to telephone men in Denver, gave his views on a four-fold classification of the race from the viewpoint of efficiency.

Down at the bottom is the indifferent class. This class includes the fellows who belong to the "What's-the-use-brigade." They are continually wondering why good fortune seems never to smile on them as it does on others who are advanced to the higher positions and the higher salaries, not realizing that as the drift floats on the waters, so every individual floats on his ability in position and salary, and cannot rise above it.

Just above this is the student class; those whose minds have awakened and are looking out broadly on things; those who see success of the right kind is not a matter of luck or chance but comes to the obedience of the natural laws that underlie and govern success. They are working earnestly and arduously to master those laws and principles, and thus improve their ability, so they are students of books, of men, of environment and of things.

Just above the students stand the adepts. Those who have thoroughly mastered the natural laws and principles so they can apply them to their work. They are truly adept in the thing they are doing, but their application requires conscious effort, as a rule. They are skillful in their line of work, because they are expert in the application of the knowledge they have gained as students.

Finally, at the top stand the masters; those who execute with the highest skill; those who have so successfully mastered the laws of success in their lines that their application comes without conscious effort. They apply those laws automatically. And the reason there is so much room at the top of the ladder is because there are so few masters.

And no master ever became a master until he was first an adept. And no adept ever became an adept until he was first a student. And no student ever became a student until he roused himself from the sleep of indifference and cancelled his membership in the "What's-the-use-brigade."

How to Make a Success of Collecting by Telephone.

Mr. Rawson, the head of the Boston Division, Collections and Adjustments Department of the New England Telephone & Telegraph Company, in the course of a visit to some other companies to study methods, found that the telephone was being used to remind delinquents that their bills were overdue.

"I wish you'd tell me how you obtain such good results?" he said to a young woman employed to telephone such reminders.

"Why, I don't know," she replied, "*I just beam on them.*"

She hadn't analyzed the reason for her success, but there it was—she "beamed on them." It was the psychological effect of a pleasant voice giving expression to a simple business proposition that, expressed in one way was a courteous reminder, while in another tone, would become a cold "dun."—*New England Telephone Topics.*

One on the Tribune.

Electricians will appreciate the following, reproduced from the New York Tribune by Patton's Monthly, a magazine devoted to the paint, glass and oil trade, and sent to us by Mr. O. Grady Freeman with the remark that it "gives an idea of the brilliancy of some newspaper reporters."

"Locating a Broken Wire.—When a telegraph wire is broken or damaged, say, several hundred miles away, how does the operator, sitting in his office, know exactly where the accident occurred?

"The explanation is simple. It requires, as every one knows, considerable force to send electricity through a wire. The longer the wire the greater, of course, must be the force required. This force is measured in units called by electricians "ohms." Let us suppose that a wire between a New York office and a point 150 miles away has broken somewhere. The telegrapher knows that when the wire was intact there were required, say,

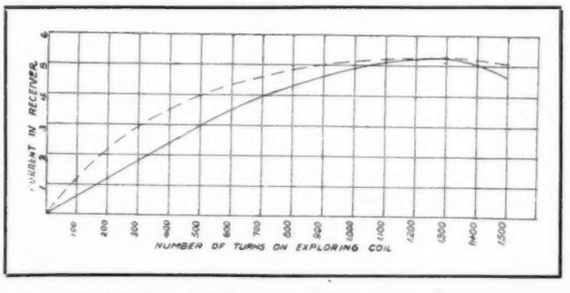


Fig. 8.—Calculated and Observed Value of Current for Different Numbers of Turns on Exploring Coil.

2,100 ohms to facilitate the current, or fourteen ohms to the mile. He now finds that he can send a current with only 700 ohms. Dividing 700 by 14, he finds that the break in the wire is fifty miles from his end." Imagine the readers of the Tribune looking about the office for the little current facilitators when they send a telegram!

Multiplex Telephony*

By Claude Ewing

By the way of an introduction to the subject of multiplex telephone circuits, it might be well to glance back over the experience of the telegraph companies who are also engaged in the business of transmitting intelligence over wires through the agency of electricity.

Shortly after the success of telegraphy from a commercial standpoint, the telegraph companies recognized the necessity of transmitting more than one message simultaneously over the same wire. Even at this early period, it was evident that the high cost of long lines, carrying one message at a time, would necessitate a message rate so high as to be prohibitory to the majority of users.

In order to make the long line a financial success at reasonable rates, it was necessary that some system be devised by which more than one message could be transmitted over a line at the same time. The solution of this problem in telegraph transmission proved an attractive field for scientists and inventors, and the present duplex and quadruplex systems of telegraph operation are the results of their labors.

The time has now arrived when the Independent toll companies must handle longer lines. In the past, the construction of long toll lines has been held up largely on account of the substantial investments required and the necessity of using all available capital to construct the shorter local lines between the various exchanges as they came into existence. The result of this growth is a very good system of pole lines carrying numerous short local circuits. It frequently happens that it is necessary to build up a circuit through five or six switchboards to reach points at a comparatively short distance. This means slow service, and poor transmission, accompanied by frequent interruptions or annoyances from the various operators coming in on the line for supervision.

The telephone companies must meet the increasing demand for good commercial service between the more distant points in their systems. This means that they must either learn a lesson from the methods adopted by the telegraph companies in overcoming similar difficulties in their systems, and equip the telephone lines with devices which will make it possible to transmit more than one message over the same line at the same time, or stand the heavy expense of constructing longer toll trunks.

The necessity of a multiplex system of working telephone circuits has been evident for a long time, but many early attempts at a solution of the problem were but partially successful. The present success along this line is due to the attainment of two things: first, the development of a special form of repeating coil combining perfect electrical balance with high transmitting efficiency; second, a systematic arrangement or transposition of the physical circuits involved to eliminate all mutual disturbances or cross-talk between the various lines composing the lead.

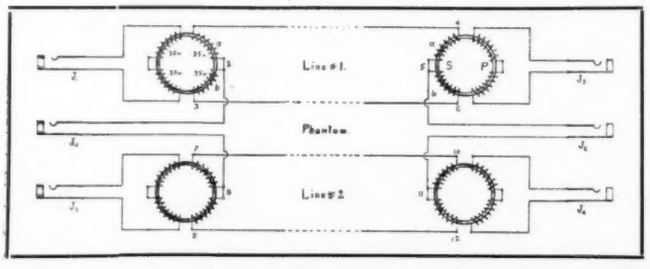


Fig. 1. Arrangement of Coils to Produce Phantom Circuit.

Three different methods have been used to obtain duplex and multiplex circuits, as follows: non-inductive resistance bridged across the ends of the circuits; balanced inductive resistances bridged across the terminals of the circuits; the use of specially wound repeating coils at the line terminals.

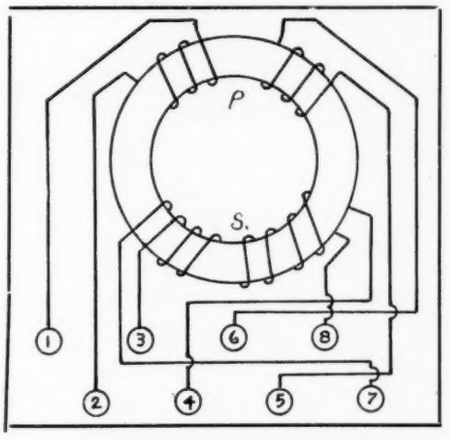


Fig. 2. Toroidal Form of Phantom Coil.

The first method is not practical, due to transmission losses; that is, provided the resistance across the ends of the circuits are high enough to prevent the formation of a low resistance shunt across the physical circuit, it means a high resistance in series with the derived circuit.

The second method overcomes some defects of the first, but is very little used for the reason that it introduces considerable resistance into the derived circuits, and all cord circuits used in establishing connections between the two physical circuits forming the multiplex and other toll lines, or the derived circuit, must be equipped with repeating coils to preserve the electrical balance of the system.

The third, or repeating coil method, requires no special equipment in the switchboards and gives exceptionally good results.

Fig. 1 shows the schematic arrangement of a multiplex or phantom circuit. The term phantom is commonly used in reference to the derived circuit, because a third circuit has been obtained without the actual addition of line wires.

The operation of such a system depends upon the symmetrical arrangement of the various instruments and conductors in such a manner that the terminal of each line connects equi-potential points of the system with respect to all other terminals except its mate.

Thus, in Fig. 1, if the two halves of the coils marked *a b* in each coil, and the lines connecting them are equivalent in all respects, pairs of line terminals connect equi-potential points with respect to points 2 and 5. Similarly, 2 and 5 will connect points of equal potential with respect to line terminals. Inasmuch as there can be no current flow between points of equal potential, the currents flowing through the physical circuits will not interfere with those in the phantom.

The repeating coil suitable for phantom work must possess the following characteristics which, given in the

*Abstract of a paper presented at the 1908 convention of the International Independent Telephone Association.

order of their importance, are: perfect electrical balance; high efficiency in transforming both talking and ringing currents; low ohmic resistance; and high insulation between the respective windings.

Electrical balance can best be obtained by the method of winding the two halves of the secondary coil in parallel.

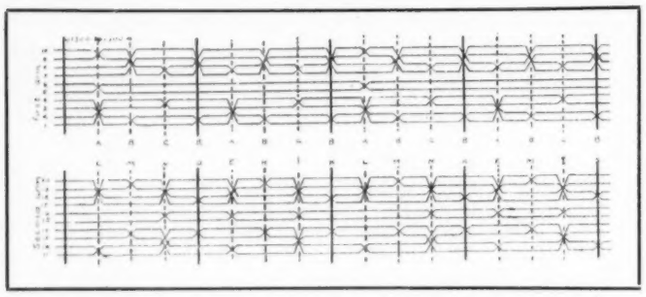


Fig. 3. Phantom and Regular Transpositions on 20-Wire Line.—A B C System.

This insures the same number of turns and the same ohmic resistance, since the two wires are of the same gauge and of equal length and equal inductance, because the turns of one coil are at exactly the same distance from the core as those of the other.

In this connection it might be well to call attention to the fact that it is not a matter of mere ohmic balance, but the impedance of the two coils must be equal as well. This means that the current flowing in each coil would be represented as follows:

$$C = \frac{E}{\sqrt{R^2 + (6.28\ F\ L)^2}}$$

Where C = current, E = voltage, R = resistance, F = frequency, L = inductance.

As a result of this balance, currents of equal value flow in opposite directions through the two equal halves of the secondary coil, thereby producing zero flux in the core and no current will be generated in the primary winding of the repeating coil.

One coil, suitable for this purpose, is made by twisting four double silk covered wires into a small cable, and this cable wound on the repeating coil spool in the regular manner. This method of winding results in an equal number of turns, equal resistance in the four windings and the same distribution of the wire with respect to the core. The core of this coil is made up from a bundle of annealed iron wire, the ends being turned back over the outside of the winding for the purpose of completing the magnetic circuit, thereby producing an efficient coil for transforming low frequency ringing currents. The coil is then inclosed in a heavy iron tube for the purpose of preventing cross talk between adjacent coils. Each of the four windings of this coil have a resistance of 140 ohms and, approximately, 3,000 turns.

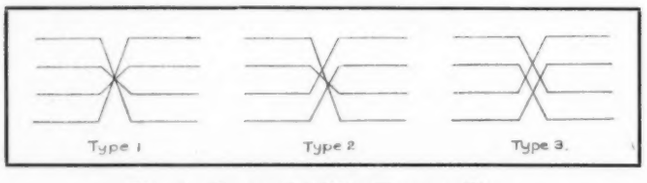


Fig. 4. Types of 4-Wire Transpositions.

Still a second type of coil, which was designed especially for phantom purposes, consists of a toroidal core of fine iron wire carefully annealed to prevent hysteresis losses, and each individual wire thoroughly oxidized in order to decrease the magnetic retentiveness of the core. The schematic arrangement of this coil is shown in Fig. 2.

An inspection of this diagram will show four distinct coils wound on the same ring shaped core—the two primary coils on one side and the two secondary on the opposite. The two halves of the primary, or switchboard side, have a resistance of 30 ohms each and are wound as two distinct coils, the terminals being brought out to clips numbered 1-2 and 5-6. The two secondary coils have a resistance of 35 ohms each and are wound in parallel, the terminals being connected to clips 3-4, and 7-8.

When this coil is used for phantom work, the following connections are made: 2-5 to switchboard; 4-7 to line; 3-8 bonded and phantom tap taken off; 1-2 bonded with copper wire or a high capacity condenser cut in series. This coil is of rather large size and is enclosed in a cross-talk proof case.

The efficiency of the two physical circuits is slightly decreased by the addition of the repeating coils. The amount of this cutting down can be determined, provided we know the rating of the repeating coil expressed in lengths of standard cable or open line wire. The makers of one of the most efficient phantom coils claim an efficiency equal to one mile of 19 gauge standard cable or 28.5 miles of No. 8 B. W. G. copper wire. This means that the introduction of a repeating coil of this rating into a No. 8 B. W. G. line is equal to adding 28.5 miles of circuit to the line.

Phantom coils should be wired to jacks or plugs on a test panel so that the phantom can be taken down when

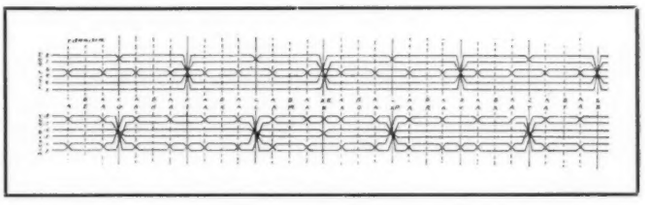


Fig. 5. Transpositions for Two Phantoms Modified Standard System.

desired. When serious trouble exists on the physical circuits of which it is composed, it becomes necessary to take down the phantom. When the phantom is to be permanent, it is advisable to wire the phantom taps permanently to the test jacks in the same manner as a regular toll circuit. This arrangement should permit the testing in and out on the phantom and also allow the cutting out of the phantom when necessary.

Two circuits to be available for phantom work must have the same resistance, capacity, inductance and leakage.

The two sides of the phantom must also be perfectly balanced or the circuit will be noisy. For this reason it is not advisable, from a practical standpoint, to phantom two copper circuits of different gages or an iron and copper, unless the circuits are transposed in such a manner that each side of the phantom will consist of the same number of sections of each gage. Such an arrangement would improve transmission over the poorer circuit and prove decidedly detrimental to the good circuit. This explains the reason why it is inadvisable to phantom dissimilar circuits.

When phantoms are to be worked in cable, it is well to bear in mind the fact that no cable has been made which is transposed so that a phantom can work through it without cross-talk. If the cable is of considerable length, more or less cross-talk will be experienced.

In case there are one or more phantoms on an aerial lead the phantoms must be transposed. Fig. 3 shows one scheme

of phantom transpositions to be used on 10-pin arms with the lines transposed according to the A. B. C. system. Attention is called to the fact that there are two systems of transposition in general use—the original A. B. C. and the Standard. The latter system is used on long leads. The A. B. C. system is used almost universally by the Independent companies.

An inspection of this diagram discloses the following types of transpositions, which are also shown separately in Fig. 4:

1. Where both physical circuits are transposed.
2. Where only one physical circuit is transposed.
3. Where neither physical circuit is transposed.

The phantom transpositions are super-imposed on the regular transpositions at regular transpositions poles. Attention is called to the changes required in the original transpositions.

In all cases it is preferable to phantom the following pairs: (1, 2-3, 4) (7, 8-9, 10) (11, 12-13, 14) (17, 18-19, 20) etc., and on rare occasions (3, 4-7, 8) etc., on 10-pin arms and (3, 4-7, 8) (13, 14-17, 18) etc., on 6-pin arms.

Diagram 3 shows the method of transposing a lead of 10-pin arms, and Fig. 5, a lead of 6-pin arms.

In designing a system of phantom transpositions, numberless combinations could be worked out, but adjacent pairs should always be selected, when practical, on account

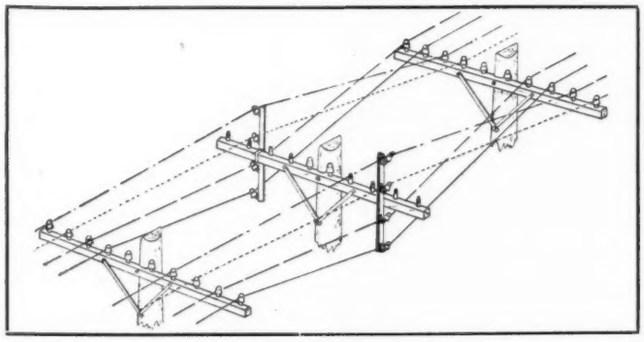


Fig. 6. Transposition of Two Phantom Circuits.—See Type 3, Fig. 4.

of the ease in making the transposition. The pole pairs should be reserved for local work and the accommodation of bridged stations. The pole pairs are not desirable for phantoms, due to the difficulty in making the transposition, and the phantom is likely to be unbalanced on account of the greater separation between the sides of this pair. It would be possible to phantom (5, 6-15, 16), although this would be a difficult transposition to make, and it introduces altogether too much complication into the system.

Coincident with the cutting in of the phantom transposition, the poles should be re-stenciled according to the transposition method adopted. The pairs being phantomed determine the system of lettering to be used.

In the earlier methods adopted for making the phantom transpositions, the wires were dead-ended on transposition insulators and rubber covered jumper wire used for altering the position of the pairs. Considerable trouble was experienced with this method, on account of bad joints, and leakage as the rubber insulation of the numerous jumpers deteriorated. On account of these defects this method was superseded by a method in which the line wires themselves are carried over each other by means of special fixtures or brackets attached to the arms.

Two types of brackets are commonly used—an underhanging bracket, carrying one standard transposition glass, and the four point bracket, carrying four regular insulators. When the first named arrangement is used a second transposition glass is placed on a cross-arm pin above the fixture and one pair tied on the glass above and the second on the glass below the arm. The four point bracket is arranged to carry two insulators above the arm and two below. In using this bracket one pair of wires is tied in on the two insulators above the arm and the sec-

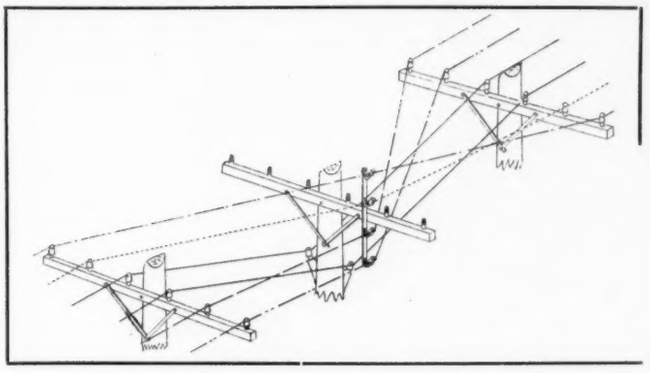


Fig. 7. Transposition of Phantom.—See Type 2, Fig. 4.

ond on the two below. Fig. 6 shows the method of using the four point bracket for transposing adjacent pairs and Fig. 7 shows its use when pairs not adjacent are transposed, as in the transposition of a 6-pin arm. In this last figure attention is called to the use of brackets placed on the pole under the arm to secure the required separation between the pole pairs and the pair leaving the pins 3-4.

Fig. 8 illustrates a four point bracket with special dimensions as shown. This special bracket was designed for the Federal Telephone & Telegraph Company, and provides a greater separation between the wires on the top and bottom glass of the bracket and the lines on the arms above or below the transposition arm.

When cutting in a phantom transposition, four pairs of grips should be used—two pairs for the lines above, and two pairs for the lines below the arm. The lines should be cut in such a manner that two of the four wires can be cut through with a single sleeve, the two remaining wires being each connected by means of a short piece of wire and two sleeves. The wire on the transposition arm and the adjacent arms on the poles on either side of the transposition pole must pull on the pins, and not on the

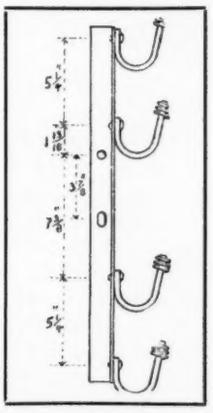


Fig. 8. Special Four-Point Transposition Bracket.

tie wires. For the sake of uniformity, all transpositions should be rotated in the same direction.

By means of special automatic apparatus installed at the terminals of the lines being transposed, and controlled by keys in a special jumpering device used by the linemen, it is possible to cut in phantom transpositions without the slightest interruption of the service.

When planning a system of phantoms, the general plan should be such that no point will be entirely dependent on a phantom. Each point should have at least one physical circuit which may be supplemented by a phantom.

Fig. 9 shows some of the possible combinations which can be worked out by using the phantom principle. In this figure *A* shows a phantom on two through circuits;

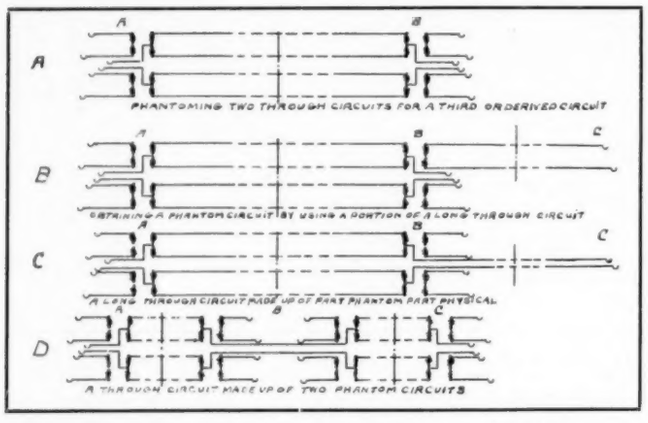

A
B
C
D
PHANTOMING TWO THROUGH CIRCUITS FOR A THIRD OR DERIVED CIRCUIT
OBTAINING A PHANTOM CIRCUIT BY USING A PORTION OF A LONG THROUGH CIRCUIT
A LONG THROUGH CIRCUIT MADE UP OF PART PHANTOM PART PHYSICAL
A THROUGH CIRCUIT MADE UP OF TWO PHANTOM CIRCUITS

Fig. 9. Possible Uses of the Phantom Principle.

B, a phantom obtained by using a portion of a long through circuit; *C*, a through circuit made up of part phantom and part physical; *D*, a through circuit obtained by using two phantoms. This last arrangement is bad, since the through circuit becomes dependent on two phantoms.

In planning the construction or re-construction of toll lines the estimate of circuit requirements should include a study of the necessity or advisability of establishing phantom circuits and the pin assignment and transposition should be specified accordingly. In stringing new or additional circuits, phantom transpositions can be made very economically, if made co-incident with the regular transposition. It is readily seen that the use of phantom circuits will result in a large saving as otherwise new circuits will be needed, compared with which the cost of the phantom is almost negligible.

The following estimates show the cost of physical and phantom circuits:

The cost of 100 circuit miles of No. 10 B. & S. copper circuit on poles and arms already erected would be approximately as follows:

Material	$5,283.00
Labor and Expense	2128.00
Cost	$7411.00

When an additional arm is necessary to carry the new circuit, the cost of 100 circuit miles of the same line, including cost of arms would be about $13,391.00.

The cost of one phantom transposition, using four point brackets, would be approximately $2.50.

Taking the cost of transposing at $2.50 each, and assuming that the transpositions are cut in every mile, the cost of 100 miles of circuit, obtained by phantoming two existing circuits, would be, approximately, as follows:

Cost of transposition	$250.00
Cost of four coils	52.00
Total cost of 100 miles	$302.00

These figures show the comparative cost of additional circuits obtained by stringing new circuits or adding a small additional cost to the present circuits, and obtaining a circuit with an efficiency greater than the original circuits.

The telephone man should give the study of phantom working more attention and avail himself of this opportunity to increase the revenue of toll lines and improve the service by establishing long haul lines.

The Wire Chief's Dream.

Last night as I lay sleeping, unmindful of all harm,
I was suddenly awakened by a dreadful night alarm,
Erect, from fear and terror, my hair stood on my head,
Two ghastly phantom circuits were standing on my bed.
That they were both unbalanced, was clear beyond a doubt,
Their legs were so distended, one would think they had the gout,
The way they talked was awful, and, almost dead with fear,
I heard this conversation, which paralyzed my ear:

"Is this the man," said number one (his wire was like a roar),
"Who cuts my transposition so I can work no more?"
"Ah, yes, 'tis he," said number two. "To him suspicion points,
As being most responsible for my poor resin joints."
"What shall we do with such a man?" they asked in accents wild,
"Torture on the relay rack would be for him too mild."

After some further cross-talk, they were at last agreed
To pack me in a toll trunk, tied by a battery lead;
Locked by a locking relay, they said, without delay,
They'd anchor me with cord weights, on Miscellaneous Bay.

Up from my bed I started, and ran with all my might.
(In school days, running jumpers had been my great delight).
Chased by the horrid phantoms, I found to my dismay,
My hurried flight had brought me to the shores of Relay Bay.
"I cannot float my load," I cried, "the current is too strong,
If I don't find the Wheatstone Bridge my life will not be long."

Just then I looked across the Bay, and saw, to my delight,
The reassuring glimmer of a trusty pilot light.
"Throw me a farmer's line," I cried, "and save me from my fate!"
The cheering cry of answering jacks told me 'twas not too late.

They bade me, in a ringing key, to grasp a local cord,
And they would work in relays, to haul me up the board.
Just as they were hauling, the cord in pieces broke,
The phantoms would have caught me, but then, of course, I awoke.

—Southern Electrician.

The Silent Use of the Telephone.

It has been known for some time that the telephone is used by Christian Scientist healers for the so-called "absent treatment"of patients, but it was not suspected that this produced much increase of business to the telephone companies. A recent report from Los Angeles, Cal., however, sheds some light on the matter. It is stated that the use of the telephone for this purpose is assuming such large proportions there that the business of the two telephone companies has been materially increased. Healers in Los Angeles and Pasadena are said to give treatment by wire to patients in Riverside, Santa Barbara, San Bernardino and other southern California points. It appears that a patient would call up a healer and hold the connection in silence, while the long distance treatment was being administered. The telephone operators would cut in on the line and getting no response to questions would pull down the connections. As a result of these broken connections on what appeared to the operators as non-busy lines, complaints began to come in to the managers leading to the discovery of the silent use of the telephone.

How He Keeps Up to Date.

One of the live ones in his state wrote for the *Indiana Clearing House Bulletin*:

"Is it any wonder that crime increases? I was in an Indiana town recently and was asked by the manager if it wasn't a fact that the Independents were about a thing of the past. When asked if he read any telephone journal, and from what source he got this information, he replied that he didn't have time to read and that he had been informed by a "Bell" man that in a very short time his company (the Bell) would own every telephone company in the United States. This manager was *very* busy when I found him pitching horseshoes."

House Warming in New Exchange at Athens, Ohio

A public reception and open house for all Independent telephone men in Ohio was given by the management of the Athens County Home Telephone Company, at Athens, Ohio, Thursday, October 14. The occasion was the completion of a new exchange and plant in the City of Athens, which is the county seat of Athens county. While it is no new territory for the company, which had operated a plant in that city before, it marks the opening to service of a complete outfit of up-to-date equipment. The old plant was entirely removed and new equipment, including conduits, cables, telephone instruments and interior work was installed.

The plant in Athens has about 1,000 subscribers, and is growing rapidly. The country development, which is one of the best in that section of the State, includes exchanges in every town and hamlet in the county. The earnings of the company are good, and with an up-to-date plant it is expected to still further increase the income.

The company is under the management of Dr. Charles L. Jones, who is noted as having a pair of twin boys and also a pair of twin girls. At the last convention of the Ohio association, at Columbus, the twin boys attended, dressed in the garb of linemen and caused a lot of comment.

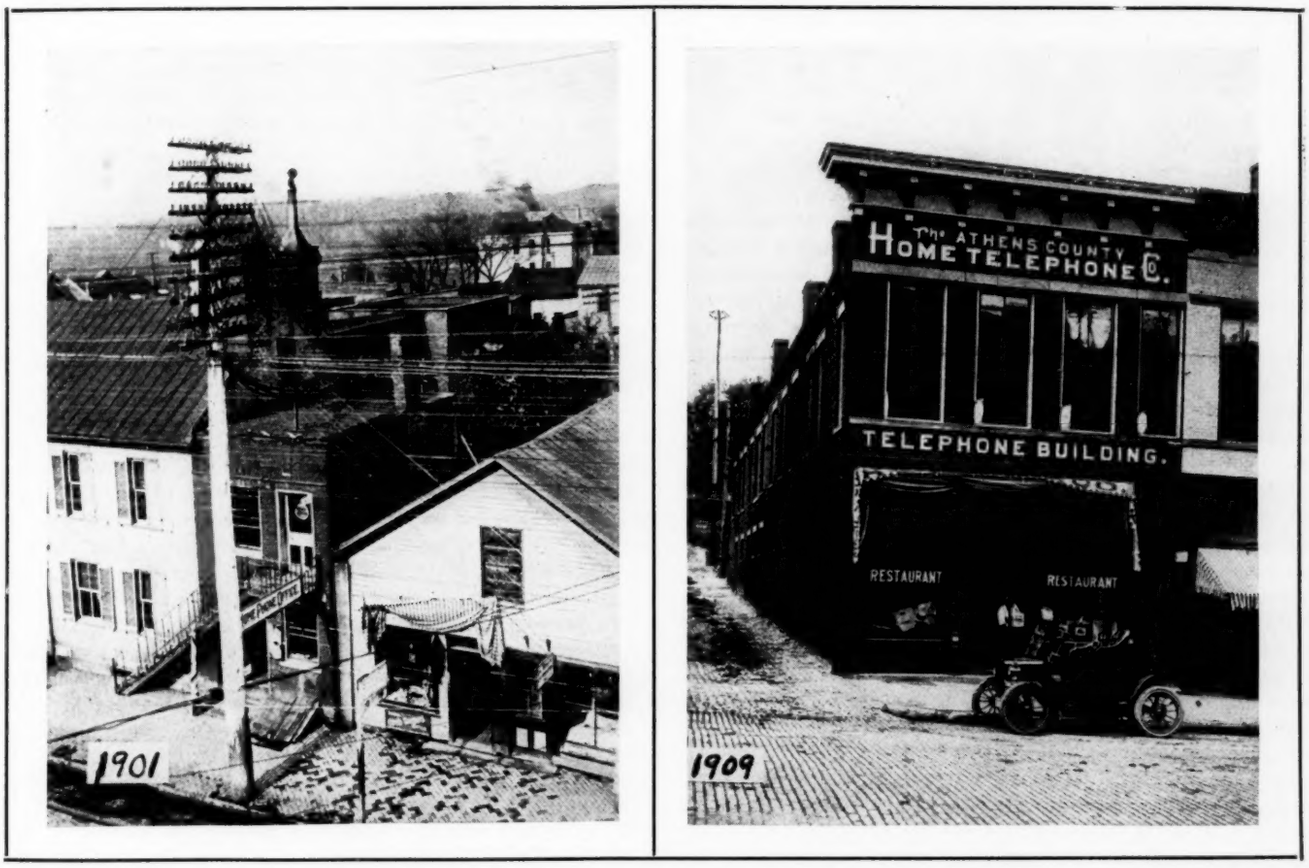
About 50 Independent telephone men from every district of the state attended the opening. The officers and directors provided the visitors with automobiles to view the outside construction and the development in the rural districts. The interior equipment was also inspected, and in the evening the festivities wound up with a banquet in the Barry hotel. Among the visitors were Frank L. Beam, president of the Ohio Independent Telephone Association, of Mt. Vernon; Cyrus Huling, of Columbus; W. A. Hopkins, of the Erner-Hopkins company of Columbus; O. O. Welsheimer, secretary of the Ohio State Association; H. S. Ross, of the Ross-Hull Electrical Company, Columbus.

The plant is considered one of the most up-to-date in the state, and other companies which contemplate rebuilding are showing a great deal of interest in the Athens system.

In a paper outlining the history of the company, which, like thousands of others, grew in the face of bitter opposition, because it filled a public need, Dr. Jones told how on Aug. 1, 1898, an Independent line to Athens was completed, and a toll station installed in his dental office.

"For two years," said Dr. Jones, "this toll station furnished the only communication by telephone with the rural district and towns in the south and west parts of the county. In the meantime, exchanges were established at McArthur and Albany, followed by the installation of a 20-drop switchboard in Athens.

"At this time, the Bell company's exchange in Athens had but 110 telephones, after having had a monopoly of the field for seven years. It had no telephones in the rural districts, so that if a physician was needed, there was but one way to get his services, and that was to drive in to town the same as had been the custom for fifty years past. Business telephones were $3.00 per month for one wire or common-return circuit, with a cigar-box transmitter. Lines, of which there were but five in Athens, at that time, equipped with long-distance transmitters and metallic cir-



Eight Years' Growth of the Athens County Home Telephone Company, from a Small Office with Aerial Outside Construction, to a Large Exchange with Underground System.

cuit, designed for satisfactory toll usage, ran as high as $5 per month. Not a single out-of-town connection beyond Herrold's mill was furnished for less than a minimum of 15 cents, and it cost 60 cents for a connection with Columbus. If you wished to reach the stockman or wool buyer in the country, you just took a day for it, and drove out. Election results were a day or two coming in and were never fully decided until some one could drive in from Lodi.

"These conditions, still fresh in the minds of many business men of Athens, still exist in many places in Ohio and other states, where competition has not furnished relief.

"Competition and the growth of a modern exchange in Athens, as shown above, came from perfectly natural causes: an unsatisfied demand for better facilities for communicating with the county seat from the business centers of the county. The Bell company agents would have you believe that all Independent telephone companies are unstable business concerns, promoted for speculative purposes altogether, and not worthy of your support, when, in fact, they have always sprung into existence in response to this demand, like that which presented itself in Athens eight years ago.

"A new telephone service in Athens under these conditions became so popular that Arthur McGrath, who acted as solicitor for the McArthur company, secured the names, as subscribers, of practically all the business people in Athens, in a single day; residences also followed in rapid succession, so that when the local company took over that part of the property in Athens county, they had a waiting list of subscribers that gave all the necessary assurance of success. Companies were organized at Glouster, Nelsonville, Amesville, Jerseyville and Coolville almost simultaneousy, and within a year, the work of developing a county system, in connection with the Athens plant as a center, was well under way.

"At about this time, however, the Bell company came in with solicitors and material, rebuilt their exchange and secured 200 subscribers at 50 cents per month, as against $1.50 per month prior to the advent of the Independent system. There are a number of these 50-cent subscribers still in Athens, much to the annoyance of the Bell management, no comprehensive plan having yet been devised whereby the price could be increased without losing the subscriber.

"Against all these odds, the Home company's exchange grew by leaps and bounds, as did the other twelve Independent exchanges in the county. An efficient system of toll lines was built, connecting them up as a unit; the United States Long Distance Telephone Company extended its copper lines to Nelsonville and Athens, giving efficient service to Columbus and other commercial centers over the State. These conditions were ideal, as growth of the properties would indicate. The one-dollar-per-month telephone—the Independent service inaugurated in residences—had by this time, become so popular that the Bell company's efforts to get the business at half-price only resulted in a temporary advantage to them.

"The marked progress, however, was made in the extensive rural service in Athens county, and more especially in Meigs county, where practically every farm-house contains a telephone, supporting over 20 exchanges, in full operation; yet to-day, and from year to year, are added more efficient equipment and better trunk lines for toll business.

"The Athens exchange finally had its capacity taxed till it was no longer able to make further additions to its switchboard, in the 10x20-foot room in which it was housed. All additional service which was taken on was handled to the detriment of the rest. The situation thus became such that practically an entire new equipment was needed.

"The Home Telephone Company then decided to sell additional stock to make the necessary improvements.

"The sale of the stock was placed in the hands of W. M. Cray, of Pomeroy, who successfully distributed it in Athens among 125 bankers, business people and farmers. Not a single six per cent dividend has been passed during the several years that any of this stock has been outstanding.

"The fact that this stock is all held locally, by parties interested in the success of this branch of the telephone business, is the Bell company's most serious obstacle, and the one upon which their efforts have been driven without effect.

"In keeping abreast with the times, the local company first realized the necessity, and made it possible for each farm-house in the county to have connection with the county seat; first felt the necessity of having each of its instruments a long-distance station, equipped with transmitters designed for that use; were first to find it necessary to string cable in order to handle their rapidly increasing business.

"When the aerial cable became congested in the business district, the plans for the new exchange specified a comprehensive underground system, owing to the liability of the aerial system being annihilated by the falling of a burning building at some unexpected moment.

"The very best and most up-to-date common battery service was none too good for Athens, as well as other county seats of its class, so the Home company ordered that kind, bought a suitable building and placed its new $10,000 switchboard therein, surrounded with all the necessaries for its operation, and conveniences for its operators, and the rest of its 25 employes.

"Now that this expenditure of $50,000.00, in improvements, has been made, and the standard of the service rendered is being elevated each day, who are those that are the greatest benefited thereby? Is it not, without a doubt, the 250 business subscribers to this service? Where before our coming, it cost $3.00 per month to derive the benefits of a hundred stations in the town, a business house now has access to 1,500 on the two systems in and immediately around Athens for the same $3.00 at regular rates.

"In Pomeroy and Middleport, where the Bell company was unmolested for 15 years, they were only able to develop 500 subscribers in all that time; and before competition, had the poorest service and most dilapidated equipment and construction of any county seat in southern Ohio. The local company there has now secured and put into operation, as many stations in one year as the Bell company did in 15 years.

"In Jackson and Wellston, where the local company finally took over the Bell company property—which, by the way, has been similarly proposed here in Athens many times—the rates were immediately elevated to the top notch, resulting in the discontinuance of wagon loads of telephones and a general dissatisfaction in both the cities named.

"It is, therefore, not hard to conceive that Athens should continue to have the benefits of competition in telephone service the same as it has in all other lines of business.

"Our long list of stockholders appreciate one's patronage more than perhaps you have any idea. An active part taken by any one locally in favor of our competitor, with its headquarters in Indianapolis, is taken more seriously, perhaps, by our stockholders than by the board of directors, and after all, is again a case where local prestige and ownership invariably wins out."

Wants Corporation Commission to Prevent Listening on Lines.

In a complaint filed against the Pioneer telephone company with the Corporation Commission of Oklahoma, C. C. Epps states that he has reason to believe that messages sent by business men and citizens of Hastings, Okla., are divulged and published in the towns of Walters and Temple. He states that Hastings is on the same line with Walters and Temple and asks the Commission to require the Pioneer telephone company to place Hastings upon a separate line.

Letters on Practical Subjects

Disturbance from Parallel Power Transmission Line.

Telephone and alternating current power lines are not good neighbors. But trouble due to the influence of the power currents on telephone wires can be minimized by proper construction and maintenance of both lines. If long distance connections are not made the effect of the power circuit is much less harmful than otherwise. A case in point is cited by O. B. Gates, manager of the Midway Telephone & Telegraph Co., Klamath Falls, Oregon, as follows:

"We operate a telephone line from Klamath Falls to Bonanza, a distance of 25 miles, parallel to an alternating current power circuit. This power line is operated at 23,000 volts, 60 cycles, and the power transmitted averages about 175 h. p., the load sometimes rising as high as 250 h.p.

"When the power line was put up we rebuilt our line, keeping on the opposite side of the road from the transmission line as much as possible. In one place we leave them for about four miles, so that the lines are about one-half mile apart. We built a first class pole line, using 26 ft. poles with 6 pin arms, braced and stringing one metallic circuit of No. 10 B. & S. hard drawn copper, transposed every half mile, and a second local circuit of No. 12 B. B. iron, transposed every mile. The transmission line is built of 30 ft. poles, using the standard tripod wiring scheme, transposed every mile for the first three miles out, then every four miles. Porcelain insulators of 100,000 volts test carry the wires. The line is well built, and free from grounds.

"We operate our telephone lines with a very little noise from the power line. It simply consists of a dead low hum. which is not at all bothersome. The power people have a metallic No. 12 copper line, strung 10 ft. below the power wires, and transposed about every ¼ mile, but this is very noisy. Occasionally we tangle up with one side of this, when our line becomes electrified to such an extent that we cannot use it.

"We consider our line a success as far as any bother from the transmission line is concerned."

Interested in Concrete Poles.

I read with considerable interest the article in your October 9 issue on the "Use and Construction of Concrete Poles" by Mr. W. M. Bailey. In my opinion we are rapidly coming to the time when we will have to look to other sources than our forests for poles, and cement "looks good" to me. Personally, I am contemplating some construction of this kind for my rural lines, and would be very grateful to hear, through TELEPHONY, from any who may have used concrete in this manner, as to the details of construction, size of poles, etc., and their experience with them in actual service. If Mr. Bailey, or any one else, would inform me where I could see some of these poles in the course of construction, if not too far distant from here, I would be glad to make the trip in order to learn all I possibly could about the making of them.

Nappanee, Ind. Claude R. Stopps,
Mgr. Nappanee Telephone Co.

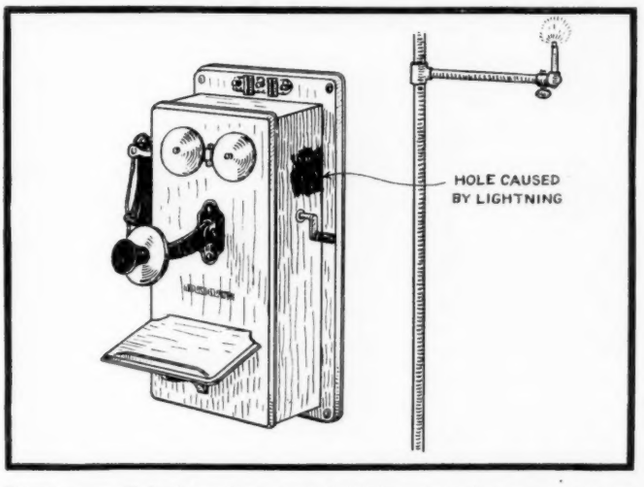
TO WIRE CHIEFS AND MAINTENANCE MEN.

Clearing of troubles which occur in your exchange, inside or outside, may be made the subject of short, practical letters which will interest other telephone men These TELEPHONY *will gladly publish, if illustrated by diagrams or photographs. Simply write a description of the nature of the trouble, tests and location, cause found, and method of repair. Payment will be made for all letters published.*

Damage to Telephone Set by Lighting.

The damage done to one of our rural telephones during a recent electrical storm is shown in the accompanying sketch.

The telephone was placed about six inches from a gas pipe, which came from the earth under the house, through the floor and up the wall to the position shown.



Damage to Telephone Set by Lightning Jumping from Set to Gas Pipe.

The arrester placed above the telephone showed every evidence of having been violently attacked by the lightning, which the ground rod, being imbedded in hard dry soil, refused to carry off efficiently.

The result being, as shown, the lightning jumped to the gas pipe, through side of telephone and wrecked several gas mantels, etc., took a piece about four inches square out of the side of the telephone, also splintered the back and other side. The telephone was, however, still working the next day, the talking and ringing circuits both being in perfect condition, thanks to Providence and the careful workmanship of the company which manufactured the set.

However, installers might see that telephones are not placed too close to grounded plumbing, unless grounded to the same.

Another case which recently came up occurred in a telephone set from which the batteries had been removed, and owing to some difficulties with the new batteries, only one of them was fit to put in a telephone. About three days later the subscriber called up the manager from another telephone saying that hers was entirely out of business again, with the usual kick about fixing it immediately or take it out.

When I went to fix it I found one of the screws holding the generator to the shelf just above the battery had become loosened and fallen down on the only cell, and across its terminals, with the result of entirely short circuiting it and placing the telephone out of service.

Dunnville, Ont. A. Morgan.

Teamsters Use Telephone Wire to Repair Harness.

The utility of a rural telephone line is sometimes demonstrated in ways not dreamed of by its builders, and not very satisfactory to them. Mr. Jas. C. Wilson, of We-

natchee, Washington, describes a rather unusual case of this type, stating that in order to reach some mills located miles from other subscribers, brackets are placed on trees and wire strung along the logging roads. Ranchers living in isolated valleys avoid setting poles by placing extra high fence posts where necessary, and in some cases work local battery circuits on barbed wire fencing.

A teamster coming out with a six-horse outfit, loaded with logs or lumber, breaks some harness or loses part of his brake. The telephone circuit is the only available wire, so down it comes.

The following clipping from the Brewster, Wn., Herald shows to some extent the trouble to telephone companies caused in this manner:

"The telephone service between Brewster and the Brewster Lumber Company's mill is not in a present state of perfection, owing to the fact that those who happen to need a piece of wire find it convenient to appropriate a portion of the telephone system to supply the above-named need. It is the desire of those who have the line in charge to impress the fact that those caught tampering with the line will be prosecuted."

Legal Questions and Decisions

By A. H. McMillan

Damage from Guy Wire.

The telephone company has lately been sued on account of injuries that a man received by running into a guy wire, being thrown out of his buggy and his leg broken. The man injured was city scavenger and the accident happened at night. The pole to which the wire was fastened was at the end of the street, which was joined by a cross street, the pole being in part covered by both streets, but at this point is quite near the right of way of the railway, and there is no traveled way at the point where the party attempted to go. I enclose a drawing to show location of pole and wire.

The drawing you enclose shows Turner street running east and west, and First street running north and south and into Turner street. Turner street ends where it runs into First street, and it does not appear whether First street crosses the railroad right-of-way, which cuts off a little to the north side of Turner street at about an angle of thirty degrees. The pole in question is located on the west line of First street opposite the place where Turner street joins First street, and the guy wire is likewise on the west side line of First street north of the pole. For the injury to have occurred, the person driving must have gone out of the traveled way of both streets. In other words, he must have been driving along Turner street toward the west and instead of turning south on First street must have continued on to the railroad property, striking the guy wire on his way. If he had kept in the street he would not have been injured. We therefore think your company is not liable. Some authorities on this point are: McMillan on Telephone Law, Sec. 118; Riley vs. New England Tel. & Teg. Co., 68 N. E., 17; Alice, Wayde City, etc., Co. vs. Billingsley, 77 S. W., 255; Davidson vs. Utah Independent Tel. Co., 97 Pac., 124; Grant vs. Sunset Tel. & Teg. Co., 94 Pac., 368; City of Fort Worth vs. Williams, 119 S. W., 137.

A Dangerous Mayor.

We have an exchange which we built in 1901. We have a franchise covering the period from 1900 to 1920; have kept up our system in good shape, etc. The mayor, on October 1, got mad because we charged him 25 cents for a 35-mile message. He telephoned to head off an Indian who had cut, with a knife, another Indian. The line was in bad shape at an intermediate point, and we had it repeated from there on. After we got the message through and the writer had found out that the Indian had gotten off of the Frisco train and went south on the K. C. S. train, we told the mayor, and he said not to send the message. We had sent it and made the record. Our "Hello girl" went to him on October 1 to collect, and he was mad because she had charged him for the message. He cursed her and after she was gone, tore out our telephone from the wall and threw it on the brick walk in front of his office and ordered me to take it away and get our system out of town or he would take an axe and break every box we had in the town. We have about 60 telephones there. He is a dangerous man. We said but little to him, as he would not accept any explanations.

What is our best course to pursue, and what rights have we in the matter? How should we proceed? At the rate he is going, he will soon destroy what it has taken us over 8 years to build up. The citizens being afraid of him, don't seem inclined to give us the protection most towns would do in this country.

Your best course is to apply to the circuit court for an injunction restraining this dangerous mayor from interfering with your property. If you have a franchise covering the period from 1900 to 1920, no orders of his, such as he gave you to get your system out of town, are of any effect. Advice in harmony with his own conduct would be to knock him into the middle of next week, in case he touched any of your property.

Trimming of Trees in Kansas.

Will you please inform me as to what is the law in Kansas regarding trimming of trees along the highway or streets by telephone companies?

The general law concerning the right to trim trees in streets and highways is as follows: A telephone company, authorized to erect its lines along a street or highway, has the right to cut away obstructing branches of trees to admit of the free passage of the wires without first giving the abutting property owners an opportunity to do so, but it will be answerable to him for any unnecessary, improper or excessive cutting. If the trees stand upon the private property of the land owner at the side of the street, or highway, they may not be trimmed without his permission and payment to him of compensation, if he requires it. On the other hand, the owner of the property is bound to use reasonable care to prevent trees on his land becoming dangerous to poles and wires lawfully erected in the highway. Any one injured by a breach of this obligation, may recover damages from the owner or should ask the authorities to take steps to clear the street or highway from obstruction. McMillan on Tel. Law, Chap. 14.

A Contract for Corporate Reorganization.

H. F. Huntington and others brought suit against the South Texas Telephone Company for damages for breach of a contract calling for a corporate reorganization. Huntington, who had a judgment against the Company, which was a lien on all its property to the amount of $35,000, agreed with trustees holding the property that it should be reorganized, and that he should take bonds of the new company to the par value of $35,000, that the total issue of bonds of the reorganized company should not exceed $150,000, and that at least $50,000 in cash from the sale of the bonds should be put into extensions or additions to the property. After Huntington's bonds had been issued and delivered to him, a portion of the remainder of the bonds were pledged, thereby placing it beyond the power of the reorganized company to comply with the agreement, and the company failed to expend the specified amount in the improvement of the property. Judgment was given for the plaintiff, but the Court of Civil Appeals of Texas reversed this and ordered a new trial of the case. In construing the agreement, it was held that the contract did not vest in the directors of the new company the

discretion to issue $115,000 in cash on the betterment of the company's property, but the issuance of the bond and the expenditure of the money, was mandatory. The failure of the company to carry out the contract was held to be a repudiation warranting Huntington in declaring the contract at an end, and suing for damages for its breach.

South Texas Tel. Co. vs. Huntington, 121 S. W., 242.

Damages for Breach of Connection Contract.

A judgment of $3,000 damages for breach of contract has been awarded by the Supreme Court of New York against the Ontario Telephone Company and the Empire State Telephone Company & Telegraph Company in favor of the Wayne-Monroe Telephone Company.

A curious part of the proceeding is that the Bell Telephone Company set up as a partial defense that the contract between the Wayne-Monroe company and the Ontario company was in restraint of trade and a violation of the anti-trust law.

Originally the plaintiff company was formed with chief offices in Williamson, New York, to do business westward, and the Ontario company was organized with main offices in Oswego, to do business eastward. On April 14 the two companies agreed in a five-year contract to extend their lines to Fair Haven, New York, where a junction would be made, for the purpose of accommodating each other on long-distance connections. Each was to act as agent for the other.

Early in 1906, the Empire State Telephone and Telegraph Company, a Bell subsidiary, bought 90 per cent of the stock of the Ontario company. In July, 1906, without notice, warning or any declaration of intention, it is alleged the Empire company's men cut the cable connecting the Wayne-Monroe line with the Ontario. The Wayne-Monroe people repaired it and, when it was cut again, soon discovered the reason.

On September 26, 1907, the Empire acquired all of the Ontario stock and merged with the smaller concern. On August 20, 1907, the Wayne-Monroe company brought an action to compel the Empire and Ontario companies to fulfill the five-year contract for interchange of service. It had been in operation two years and three months and there were still two years and nine months to run. A demurrer was filed by the Empire company on the ground that the contract was in restraint of trade and hence illegal The demurrer was overruled by Justice Sutherland.

In the recent decision, the court found that during the period between July, 1906, and April 14, 1909, if the contract had been duly performed, the plaintiff would have received the sum of $3,000 in excess of the additional amount which it would have been required to expend in order to carry out the conditions of the contract.

For the Practical Conference

Suggestions for Elaboration by the Contribution of Detailed Experiences and Conclusions

Interest in the Practical Conference to be held during the forthcoming National Convention is rapidly extending, and everybody who takes part will have the satisfaction of being associated with some of the best men in the Independent field in work for the common good. In TELEPHONY for Oct. 16 and Oct. 23 appeared outlines suggesting phases of general topics, which men throughout the field are invited to discuss; the suggestions printed below are for the same purpose.

Discussions should be prepared as far in advance of the convention—Dec. 7, 8, 9—as possible, and one copy mailed to G. R. Johnston, Columbus, Ohio, chairman of the programme committee. Contributions from men unable to be present at the convention will be read for them.

THE PROBLEM OF LOW RATES.

Conditions.

1. Independent telephone rates as a rule were remunerative at the outset.
2. Costs have increased.
   - (A) By causes growing out of exchange enlargement, making
     1. Longer average lines,
     2. More calls per line,
     3. More complicated and costly switchboard connections,
     4. Sometimes losses through public demands not predictable, or to be supplied with the original facilities.
   - (A) By advance in material and labor costs.
   - (C) In many instances, by costs of defense against Bell monopolistic tactics.

Remedies.

1. Increased rates.
   - (A) From direct company action, with or without special municipal authority.
     1. This may lead to such public objections that it may not be pursued; but
        - (A) The objections will be those of an uninformed, unreasoning body. The individual users are prepared to pay more rather than relinquish their service if convinced that this course is just or inevitable.
        - (B) The public can be educated to a true appreciation of the real facts.
        - (C) If betterment of service is offered the public when rates are to be changed, objections may be diminished.
        - (D) If advances are not effective for all at the same time or if adjustments are made by which some classes get lower rates or equal rates, the objections may be diminished.
2. The formation of a state regulative body, with power over rates, to which the company can appeal for an authoritative pronouncement that its rates are inadequate.
   - (A) This course involves some risks, particularly as to the character of the commission and its susceptibility to public clamor.
   - (B) To justify its existence, the commission may not stop with judicious regulation, but may impose unnecessary burdens.
3. Combination with Bell. This means
   - (A) Disloyalty to associates.
   - (B) Violation of contracts.
   - (C) Violation of law (in many, if not all cases).
   - (D) Opportunity for new competition.
   - (E) Increased costs (in a large proportion of cases).
   - (F) Public (and private) disfavor.
4. Change in form of charging from flat to

measured-rates designed to yield greater average revenue.

(A) Is the balance of judgment for or against this for its own sake? Does it offer advantages over an outright raise?

5. Reduced costs, available at times from
   1. More careful attention to savings, better knowledge, restriction of development after reaching the economic stage, (in rural construction) direct assistance from subscribers.
   2. Joint use of others' poles or ducts.
   3. Reduction in service standard, as in changes to party-lines with better relative rates.
   4. Change to equipment involving less expense, as from magneto to common battery.
   5. Adoption of economic inventions. This field offers much for the future.
   6. Possible economic additions through small branch exchanges.
   7. (Coming sometime, maybe): Cessation of Bell's efforts to gain control.
   8. Possible local combinations with associate companies, if economies could be effected or efficiency improved.
6. Correction of abuses, if any. As of
   (A) Revenue.
      1. Free or reduced rate telephones.
      2. Free calling between exchanges.
      3. Free toll privileges of employes or others.
      4. Transfering of messages properly toll massages.
      5. Disregard of overtime on toll messages.
      6. Over-use by non-subscribers.
   (B) Costs.
      1. Unnecessary burden upon operators, as through permitting calls by name, giving out information, making appointments.
      2. Unnecessary trips of collectors.
      3. Delays in payment.
7. Development of special sources of revenue.
   1. Toll service.
   2. Local pay-station service.
   3. Charges for moves and all special attention.
   4. Collections in advance of installation.
   5. Directory name service.
   6. Directory advertising.
   7. Telegraph connections.
   8. Private lines.
   9. Rental of pole contracts and subway ducts.
   10. Changes from residence to business classes.
8. Possible development of by-products, or new classes of revenue.

NOTE: In 5, 6 and 7 may be many items enforcible without affecting the general public sufficiently to bring objection, while having a special value preparatory to a general raise of rates, as displaying that the company is in earnest. Such possible items as are contemplated in 8 will probably fall into the same class.

ECONOMY.

It is suggested that assistance could be rendered in the study of economy by the definition and use of certain units of division in relation to account headings or special items of cost.

Request is made for definition and list of uses of the following units or any additions thereto:

Lines	(Total (In use	
Instruments Subscribers		
Calls	(	(Completed (Busy (Don't answer, or otherwise lost
Dollars in revenue	(Completed	

It would be useful also if uniform definitions could be prepared of **complaints** and **troubles.**

Statute of Limitations in Anti-Trust Prosecution.

At New York City on October 26, Justice Holt of the U. S. Circuit court dismissed indictments against two of the men accused, with the American Sugar Refining Company, of conspiracy in restraint of trade. The ground for their dismissal was that the operation of the statutes of limitations invalidates any action against them, inasmuch as the offense for which they were indicted was committed more than three years ago. The government attorneys pleaded that the crime charged against Kissel and Harned was a "continuing offense" and that as long as the conspiracy continued and the plant of the Pennsylvania company remained closed through the action of the American Sugar Refining Company the three year period of the statute of limitations should not begin to run.

Ohio Telephone Pay Stations Not Defrauded by the Lincoln Penny.

The telephone companies of Columbus, Ohio, which recently installed pay instruments in all the drug stores and many of the groceries of the Buckeye capital, has stopped the practice of the public of using the new Lincoln penny in the place of a nickel in working the coin collectors. In many cases the new coin worked the mechanism of the pay instrument and a method was sought to prevent the using of the lesser coin.

The telephone girls experimenting found that different clicks were heard when a nickel and when a penny was dropped. This is the basis of the method by which the practice will be stopped.

Australian Engineer Desires to Correspond With Telephone Men in the States.

TELEPHONY is the recipient of a letter from a young Australian telephone engineer, in which he expresses a desire to get in touch with experienced telephone men in the states. His idea is to carry on a correspondence, interchanging ideas of mutual interest regarding telephone matters in this country and his own. Letters addressed to Australian Telephone Engineer, care TELEPHONY, will be forwarded.

Educating the Subscriber in Telephone Courtesy.

Even the rural telephone company finds that it pays to encourage its subscribers and operators to be in good humor when talking over the wires. The accompanying cut used by a small Pennsylvania company is an indication of the way this proposition is being worked out.

LeRaysville Borough.

People's Consolidated Telephone System.

Long Distance a Specialty **Inquire of Operator.**

If You Want Good Service

Be Patient—The Operator may be crowded and Lines busy.
Be Polite—It pays. Vinegar catches no flies.
Be Prompt and Pointed—There are others waiting

Exchange closes at 9:30. except Saturday Evenings Open Sundays but Operators need rest.

Explanation of Newell Numeral Code

5 means a long ring—Three to five brisk turns. 1 means a short ring—One complete turn.
1, 2, 3 and 4, the number of shorts. Leave crank at low point

Call by Number as: "Residence, 55, or "Business 252, please

Central, Billings & Son, 5.

DRUGS, GROCERIES, ETC.

Ringing Instruction Card Which Also Emphasizes Points of Telephone Etiquette.

Answers to Queries

Subscribers may submit for answer in this department any questions on practical telephone topics, such as construction, circuits, electrical theory, troubles, operating, traffic, costs, records, business methods, etc.

The answer to each question will be furnished by a man recognized as expert in that particular branch of telephony.

In case the answer cannot be published it will be forwarded by mail. No charge is made for this service, and subscribers are encouraged to consult us freely and frequently.

In every case a thoroughly complete description of local conditions is required to insure a satisfactory answer.

Grounded Phantom Extension for Metallic Line.

In what way, if any, can a grounded line be run from the end of a metallic line and phantomed into the office?

To run a ground return extension to "Central" over a metallic circuit, wire as shown in Fig. 1.

Use the best balanced ring through repeating coils obtainable. The repeating coil at the end remote from the central office must be installed in a residence or other shelter. See that the coil is protected from lightning damage by properly installed arresters.

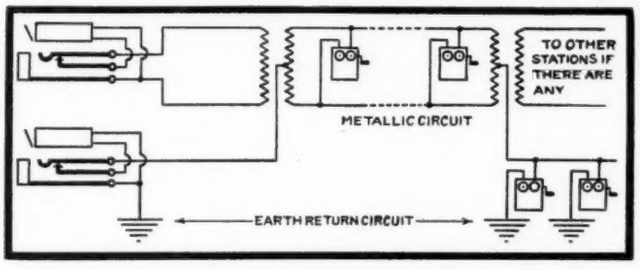


Fig. 1.

Hotel Branch Exchange.

We are asked to put a plant of fifty telephones in a hotel. They want us to own the plant, and rent it to the hotel.

Please advise us through TELEPHONY what kind of plant we should use. Give details as to the wiring, switchboard, telephones, etc. How much rent should we charge the hotel for the use of this plant? How much should we allow the hotel on long-distance and local calls? How many trunks should we have between the P. B. X. and the central office? Should we charge the hotel an extra rental for the town service above the regular rent of the plant for the hotel use?

We are expected to keep the plant in repair. The hotel clerk will do the operating.

Several Independent manufacturers supply high grade switchboards built especially for this type of service. We would suggest that you write to manufacturers of common battery equipment, or magneto equipment, whichever you have in your exchange system, and obtain full information as to cabinets, apparatus, circuits, price, etc.

The arrangement whereby the telephone company owns the plant and rents it to the hotel is a good one, but as the cost of installation is high enough to represent a very considerable amount of investment, and as you will probably use special types of telephones, you should be sure to have a long enough term of contract to make you safe. The rental practice varies according to local rates, the amount of use made of long-distance service, etc., and we should not care to advise you on this point without studying the local situation thoroughly.

The most usual plan for rental is to charge a monthly rate for the switchboard, for each hotel station, and for each trunk line entering it, and regular rates for toll messages, with a commission to the hotel. The hotel hires its own operator, or provides for operating the branch exchange in connection with the other duties of a regular employe. It is not usual to allow the hotel anything on local calls. In cases where measured rate service is in vogue, however, hotels usually contract for their local calls in quantities large enough to secure a lower rate than five cents per message, and collect from patrons five cents for each call. Of course a hotel gets the benefit of the telephone system for calls within the building, replacing the old style annunciators and saving the time of boys, etc., on errands. Local service is also a good advertisement, and is, in fact, a necessity for every up-to-date hotel.

We would suggest that you figure out carefully what your installation, maintenance and operating costs will amount to, as well as interest on the investment and depreciation, and make your rate cover these points, and a fair profit.

If the data used in figuring this out are correct you cannot go far astray. This is a better plan than to employ a hit-or-miss method, or even use the practice of other companies as a help in guessing at a rate, except in so far as it is based on the same underlying conditions as you have in your exchange.

Among the Companies

INTERNATIONAL CONVENTION, AUDITORIUM HOTEL, CHICAGO, DEC. 7, 8, 9.

Illinois, Decatur, November 10-11.

Question of Ownership of Control in Some Ohio and Indiana Telephone Properties.

The news sensation of the telephone world, or at least that portion of it in the Central States, during the past few days, has been based upon reports of all kinds circulated since James S. Brailey, Jr., of Toledo, Ohio, purchased the Everett-Moore holdings in the United States Long Distance and the Cuyahoga telephone companies.

The purchase of these holdings required in the neighborhood of $2,000,000 in cash and as it was popularly estimated that Mr. Brailey could not raise this amount on his own assets at short notice, conjecture was started as to where he obtained it. Further discussion was precipitated when the Brailey interests in the U. S. telephone directorate refused to ratify the lease of the U. S. Long Distance Company to the Ohio Home Telephone Company, which had been favorably acted upon at a previous stockholders' meeting, although the Cuyahoga and Toledo Home companies, in which Mr. Brailey is heavily interested, were among the heavy subscribers to stock in the Ohio company.

The Toledo Blade came out on Saturday with an article

affirming in strongest terms that the Bell company had purchased the Brailey holdings, not only in the U. S. and Cuyahoga companies, but in the New Long Distance and Indianapolis companies, of Indiana. This was circulated all over the country by the Associated Press and was followed by a prompt denial. Mr. Brailey gave to the newspapers, and to a representative of TELEPHONY, a signed statement, here reproduced in fac simile, stating

That there is absolutely no truth in the rumors that the Bell Company has acquired an interest in any of the properties with which he is associated.

That for two years he has been working on a new syndicate to take an interest in the telephone properties in which he is interested, and that he completed his financial arrangements about four weeks ago, and since ther has been arranging to buy additional securities for his syndicate

That he is personally interested in his syndicate and that he expects to permanently remain one of the largest holders of Independent Telephone Securities.

Mr. Broiley further stated that the United States Telephone Company is going ahead with its development work and is about to put up a new No. 8 copper circuit between Columbus and Toledo, and between Columbus and London, and that he wanted every Independent Company and Interest in Ohio to know that the United States Telephone Company would do everything in its power to protect their interests in the future the same as it has in the past.

Jas A Brailey Jr

The distribution of newspaper reports focused attention on this situation and TELEPHONY'S correspondents at all points where information could be gathered, were busy during the early part of the week endeavoring to sift out the important items and opinions having a bearing on this situation, from the great mass of gossip which has been afloat. A large number of persons who are representative of different interests were consulted, and the following summary of expressions collected in many different places is presented as an item of interest.

F. H. Goff, president of the Cleveland Trust Co. acted as intermediary for the Everett-Moore syndicate in the negotiations for the sale.

After the newspapers started the report that the Bell interests were backing Mr. Brailey, Mr. Goff said: "It is very generally reported that the Bell people are the real purchasers. That opinion seems to prevail in the city, but I can state positively that the Bell people are not concerned."

Charles S. Norton, secretary-treasurer of the New Long Distance Telephone Company, at Indianapolis, said the story of the merger was without foundation.

Said Mr. Norton: "Mr. Brailey and his associates in Ohio, Indiana, and St. Louis have no intention of selling out to the Bell concern. The recent deals in Ohio are merely steps in the progress of unifying the Ohio Independent system and more closely to associate it with our Indiana system. The New Long Distance company and the Indianapolis Telephone Company are practically identical in ownership."

Clarence Brown, of Toledo, attorney for the Brailey interests, said Mr. Brailey and his associates had obtained control of the companies mentioned, and would continue in the management.

"Then it is not true that the Bell company has obtained options on this property?" he was asked.

"If it has I do not know of it," he replied.

Central Union officials at Indianapolis denied that there had been any deal with Mr. Brailey to put the control of the Independent properties in Bell hands.

TELEPHONY'S correspondent at Cleveland reported as follows:

"Local officials of the United States Telephone Company and the Cuyahoga Telephone Company at Cleveland stated to TELEPHONY'S representative in the early part of the week that they had no detailed information regarding the matter, beyond what had been given out by Mr. Brailey. To them he said that there would be no change either in the management or the policy of the companies, and that development work would proceed just as it has been and all uncompleted construction work would be pushed through to completion. While in that city he gave no idea of the financial interests associated with him either to the telephone or financial men, so far as could be ascertained. The inference drawn from what he said along this line is that the matter was in such a state then that he could not give details of any kind.

"Mr. Brailey said that the Toledo story probably originated from the fact that he had been purchasing some scattering securities in Toledo, Indianapolis and other places for his syndicate. He desires to secure all the stock he can for the syndicate, although he now controls enough to command the complete board of directors of both companies. The small stockholders have never been represented on the board and heretofore the directorate has represented the Everett-Moore syndicate.

"P. Yensen, general manager of the Cleveland Telephone Company, stated that he had absolutely no knowledge of the situation except what he had seen in the newspapers. He said that reports similar to this had come out about just so often in the past, and that he had gotten so he gave little attention to them. If the Bell interests are negotiating with Mr. Brailey, he said he knew nothing of it.

"S. W. Harper, treasurer of the National Telephone Corporation, controlling Independent interests in Wheeling, W. Va., Pittsburgh and several counties in both states, was in conference in Cleveland with Frank L. Beam, president of the Ohio Independent Telephone Association, Saturday evening. Both stated that Mr. Brailey had said he has no intention of surrendering control to the Bell interests.

"Mr. Beam discussed the situation freely when here, but always in line with the idea that there will be no change in the policy of the companies in question.

"Mr. Beam also discussed the position now occupied by the Independent companies in the war which is being waged in this state on rates. He said that the Bell people are engaged in a big advertising campaign, and perfect unity and co-operation on the part of the Independents is required to meet it. All the long-distance lines are overloaded with business just now, as the result of a cut in the rates, and the service is being taxed to its utmost. He said he believed another year would see an arrangement for still closer co-operation, as a result of the recent moves, and that the Independents will be able to meet everything that comes their way by acting together."

Many Independents who were consulted by TELEPHONY's representatives expressed themselves as believing firmly that, aside from any consideration of sentiment, Mr. Brailey is so tied up with the Independent telephone interests in the middle west that he could not afford to betray them. He has been connected with the Independent telephone movement in Ohio and other states for more than a decade, and many people who know him stated that they refuse to believe that he would sell out at this time to the Bell company. One Independent man, whose name would carry weight, said: "I believe his interests are identical with ours, and I think he is on the square in this deal." It is known that Mr. Brailey has for years had in mind a project for extending Independent long-distance development, and his efforts for some time have been bent in that direction. Naturally the acquisition of the United States and the Cuyahoga companies would only further that effort, and it was not unexpected.

Mr. Everett, who is at the head of the Everett-Moore syndicate, is in very poor health, and it is known that he has been endeavoring to put his affairs in such shape that they will not require a great amount of attention from him.

In Ohio few people know just how large a part of the capital stock of the Cuyahoga and U. S. companies the Everett-Moore syndicate held, but it was known that the holdings of Mr. Brailey with those of the Everett-Moore people would give complete control of the properties.

Inquiries in financial circles revealed a general disbelief in possibilties of such a sale as the Toledo Blade report mentioned.

Inquiry of telephone managers and capitalists interested in the Independent business, who have associated with Mr. Brailey for years, brought forth expressions of distrust of the report, as being foreign to the possiiblities of the situation.

A prominent attorney of Ohio, when questioned as to his view of the matter, said that in the first place the policy of the U. S. Long Distance Company is controlled by a voting pool, with the object of maintaining its Independence, which is elected for a term of years and which, he is inclined to believe cannot be dissolved without the consent of all the members of the pool. If the pool could be dissolved by the new control, there is a Board of Directors who are friendly to the Independent interests, and which could not be removed until the next annual meeting of the corporation, which takes place some time next summer.

With regard to the question of a tentative agreement between the Home Telephone Company of Ohio and the United States company, made prior to the acquisition of control by Mr. Brailey, this attorney, speaking without investigation, expressed the idea that the agreement is binding, so that there is the board of directors, the voting pool, and the tentative agreement which, even if the deal had been considered, would have stood between the Independents and the turning over of the U. S. property to the Bell interests. Further, it is well known throughout Ohio that attorneys for the Independent interests would not hesitate a minute if any deal had been made to turn over the property to the Bell, but would stop the transfer by injunctions and suits based on the anti-trust laws of Ohio and on the Sherman law of the Federal Government. It is known throughout the State that the Bell people feel a great fear of the result of such litigation, believing that they are governed by these laws, and thinking that they would apply in case they should try to take over competing long-distance lines. It is said on good authority that a number of mergers with the Bell company would have been closed recently, if it had not been for fear of prosecution under the anti-trust laws.

A correspondent at Columbus interviewed a high official of the Central Union company, in charge there, but he could give no information, although admitting that the matter might be carried out through the Indianapolis office without his knowledge. The Columbus representative of the sublicense department of the Central Union was out of town when an interview was sought.

The public's request for evidence in confirmation of the denial, and particularly as to where Mr. Brailey obtained the money to purchase the Everett-Moore holdings, was met with a refusal of detailed information. While the denial of Mr. Brailey and the related opinions of persons who have been associated with him, furnish strong evidence, the telephone situation in Ohio will not be clearly understood until this question is settled.

The impossibility of blocking. Independent progress at this time, and embarrassing the small companies which, by union, are enabled to resist and overcome the repeated attacks of their competitor, is shown by the plans which have been under discussion as possible of execution if the newspaper reports of the sale had been correct. Attorneys would be prepared to invoke the aid of the law to prevent the consummation of a transfer of control which would tend to eliminate competition. Further than this, to protect the local companies, there would be ready for entry into the field the newly organized Continental Telephone and Telegraph Company, which, although organized only a few days ago in New Jersey, succeeds a long distance syndicate in which are interested a very large number of thoroughly reliable Independents, who are also heavily interested in, and connected with, the operation of local properties throughout the central and eastern states.

This organization is now very generally known to be amply provided with funds, and to have all ready for execution plans for an extensive toll service which will make the Independent telephone plants of the country, in its truest sense, a part of a united system which will preserve, by co-operation and contractual relations, all the elements of strength inherent in the possession of a comabsolute independence and continued local control. Contracts providing for interchange of toll business, use of lines, etc., with several hundred representative local systems covering the middle and eastern sections of the country have been signed, covering most of the territory from the Missouri river east.

It is understood that the Continental company has contracts for the interchange of toll service covering the entire systems of the United States, Cuyahoga, Indianapolis and New Long Distance Companies and their associated companise, of which Mr. Brailey has control. But even if the U. S. Telephone Company should refuse to abide by this contract, the Continental company would have ample means and the disposition to go forth among the local companies of Ohio, obtain contracts for direct connections, and build lines, duplicating the United States system if necessary, in order to maintain the integrity of this portion of the Independent telephone system of the country.

A Deserved Promotion.

A clipping recently received by TELEPHONY from one of the Marion, Ohio, newspapers announces the deserved promotion of Arthur J. Berry to the management of the Marion County Telephone Company, vice D. M. Odaffer retired. Mr. Berry is widely known throughout the telephone field as the inventor of the Berry lightning arrester and he, furthermore is a very practical and successful telephone man. Marion is his home town and he has been connected with the Marion County Telephone Company for a number of years.

Keystone September Report Shows Usual Increase in Returns.

The report of the Keystone Telephone Company, of Philadelphia, for the month of September and three months ended September 30 compares as follows:

	1909	1908	Changes
September gross	$ 91,908	$ 87,656	Inc. $ 4,252
Expenses and taxes	45,070	42,873	Inc. 2,197
September net	$ 46,838	$ 44,783	Inc. $ 2,055
Charges	33,016	84,445	Dec. 1,430
September surplus	$ 13,823	$ 10,338	Inc. $ 3,485
Three months' gross	272,851	262,187	Inc. 10,664
Expenses and taxes	135,523	131,334	Inc. 4,189
Three months' net	$137,130	$130,803	Inc. $ 6,475
Charges	101,827	103,684	Dec. 1,857
Three months' surplus	$ 35,501	$ 27,169	Inc. $ 8,332

Bell Merger Proposition Blocked by New Jersey Courts.

At Trenton, N. J., on Oct. 20, Vice Chancellor Howell granted an order restraining the transfer of any of the property or securities of the Interstate Telephone Co., to the American Telephone & Telegraph Co., or any of the subsidiary corporations comprising the Bell system, and restraining the American Telephone & Telegraph Co. and its associated corporations from taking any steps to have the Bell system acquire control of the Interstate Telephone Co.

The application for the injunction was made by Robert H. McCarter, representing Charles West, of Harrisburg; Louis Kuehnle and Charles Fortner, of Atlantic City; the American Electric Telephone Co., of Chicago, and the Stromberg-Carlson Telephone Manufacturing Co., all of whom are holders of the stock or securities of the Interstate company. The ground upon which the injunction was sought is that the proposed sale of the Interstate company to the Bell system is in violation of the terms of an agreement under which about 78 per cent of the holdings in the Interstate company were pooled and deposited with Mercer Trust Company, under control of Mr. West, William S. Hancock and Harry R. Swartz of this city.

The bill of complaint set forth that many of the franchises obtained by the Interstate company were granted on the express understanding that the lines to be constructed were to be maintained and operated in competition with the Bell system. As a result of combinations with other companies, it is alleged that the Interstate company now controls about 10,000 telephones in New Jersey and has connections with 237,000 other telephones in New York, Pennsylvania, Ohio, Virginia, West Virginia, Delaware and Maryland.

The complainants alleged that as a result of other contractual relations throughout the United States there are now Independent telephone lines of sufficient magnitude to successfully compete with the Bell system, unless the latter should absorb or acquire control of the Independent lines. It is specifically charged that the American Telephone & Telegraph Co. with its affiliated corporations constitutes a monopoly in violation of the Sherman anti-trust act, this being advanced as another reason for judicial interference by a court of equity.

It is also alleged that the Delaware & Atlantic Co., a part of the Bell system, organized in 1904, is illegal because the company, while organized under a special act to regulate telegraph companies, attempted to arrogate to itself the powers conferred under the general corporation act.

Mr. West in an affidavit annexed to the bill stated that he had consented to become a member of the committee with Mr. Hancock and Mr. Swartz with the understanding that the Interstate company should not be disposed of to the Bell system. He said that the other two members of the committee have nevertheless signified their intentions of ending negotiations with the Independent concerns and disposing of the trust holdings to the Bell system. This, he says, is beyond the powers of the company, which is a public utilities corporation.

The Interstate Telephone Co. operates directly with the Consolidated Telephone Co. and the Keystone Telephone Co. of Philadelphia. It has a capital stock of $600,000, first mortgage bonds of $602,400 and second mortgage bonds of $2,160,000.

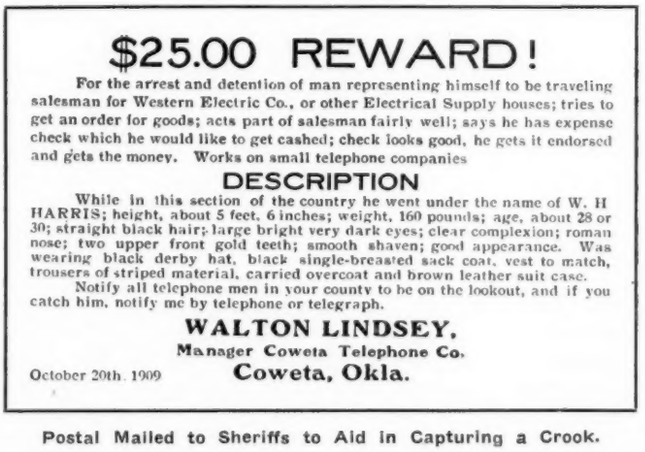
Ohio District Meetings.

The Ohio Independent Telephone Association has sent out notices of the dates upon which the district meetings will be held. They are as follows: District No. 1, Cleveland, November 8, Electric building, 10:00 A.M., Washington Hyde, Warren, vice-president; District No. 9, Toledo, November 9, Boody House, 1:00 P.M., R. E. Hamblin, Toledo, vice-president; District No. 7, Lima, November 10, Hotel Norval, 1:00 P.M., Geo. H. Metheany, Lima, vice-president; Districts 5 and 6, joint meeting, Dayton, November 11, Dayton Home Telephone building, 1:00 P.M., J. H. Ainsworth, Dayton, and S. H. Allen, Oxford, vice-presidents; District No. 2, New Philadelphia, November 12, I. O. O. F. Temple, 1:00 P.M., H. L. Beatty, Ravenna, vice-president; District No. 9, Mansfield, November 16, Mayor's court room, 1:00 P.M., Dwight E. Sapp, Mt. Vernon, vice-president; District No. 3, Zanesville, November 17, Clarendon Hotel, 1:00 P.M., J. B. Rhodes, Zanesville, vice-president; District No. 4, Chillicothe, November 18, Warner House, 1:00 P.M., W. R. Fee, Portsmouth, vice-president; special meeting, Brown, Adams, Highland and Clermont counties at Georgetown, November 19, local exchange building, 10:00 A.M.

The Association requests if representatives are unable for any reason to attend the meeting in their own district, that efforts be made to attend at least one of the other meetings.

Help Nail a Crook!

I am enclosing a card—one of a bunch which I mailed to the sheriff of every county in Missouri and Kansas. The card tells a story of its own. I endorsed this fellow's check for $31.50, and I'll spend more than that much more to



$25.00 REWARD!

For the arrest and detention of man representing himself to be traveling salesman for Western Electric Co., or other Electrical Supply houses; tries to get an order for goods; acts part of salesman fairly well; says he has expense check which he would like to get cashed; check looks good, he gets it endorsed and gets the money. Works on small telephone companies

DESCRIPTION

While in this section of the country he went under the name of W. H HARRIS; height, about 5 feet, 6 inches; weight, 160 pounds; age, about 28 or 30; straight black hair; large bright very dark eyes; clear complexion; roman nose; two upper front gold teeth; smooth shaven; good appearance. Was wearing black derby hat, black single-breasted sack coat, vest to match, trousers of striped material, carried overcoat and brown leather suit case.

Notify all telephone men in your county to be on the lookout, and if you catch him, notify me by telephone or telegraph.

WALTON LINDSEY,
Manager Coweta Telephone Co.
October 20th. 1909 Coweta, Okla.

Postal Mailed to Sheriffs to Aid in Capturing a Crook.

get him. He got $25.00 from Mr. McGuire, at Broken Arrow, the same day he got me. I hear of a fellow who fits his description who is wanted by a telephone man at Henrietta, Texas; looks as though he was headed north, and as he went to Tulsa from here I'm taking the chance that way, and mailing my cards to Kansas and Missouri,

and also some to the sheriffs in the northwest part of Oklahoma. It will be to the interest of telephone men everywhere that you publish an account of this fellow. The card gives a good description of him, and is fairly accurate as to height, weight and age. He passed through here Friday afternoon, the 15th of October.

Coweta, Okla. Walton Lindsey.

Death of W. W. Cargill.

W. W. Cargill, of La Crosse, Wis., died at his home in that city on Oct. 17. He was widely known as a leading citizen, as a successful head of many varied business interests, and was prominently identified with industries which he did not control.

He built up and owned the grain business of the W. W. Cargill Co., La Crosse; the Cargill Elevator Co., Minneapolis, and the Superior Terminal Co., Superior, Wis. He was owner of a large, successful lumber business, and the builder of the La Crosse & Southeastern Railroad. Among enterprises in which he was a heavy stockholder were the La Crosse City Railway Co., the La Crosse Gas & Electric Co., and the La Crosse Wool & Fur Co., besides a large number of smaller corporations doing business in La Crosse. He was vice-president and one of the directors of the Green Bay, Kewaunee & Western Railroad, which runs from Green Bay to Kewaunee.

Mr. Cargill, always a firm believer in the Independent telephone industry, was president and a leading stockholder of the Vote-Berger Company and a big stockholder in the La Crosse Telephone Company.

He was noted for his interest in public affairs, and was a member of many clubs and business organizations. His generosity in a good cause, and the sound judgment and financial aid which he freely put at the disposal of many individuals and movements for the public good, won him the love and respect of his fellow citizens.

Colorado Telephone Operator a Heroine.

On August 17, at about 4:20 p. m., a cloudburst occured near Howard, Colorado, sweeping the country from about a mile west of that village to a point about three miles below. The D. & R. G. tracks were washed out, the county road was rendered impassable, irrigation ditches were destroyed and hay and grain in the fields were ruined. Practically every building in Howard was flooded.

The operator, Dollie Beeson, at Howard, proved to be the heroine of the disaster. Notwithstanding the fact that the flood poured into the exchange she remained at her post, putting up connections and sending out warnings to those in the path of the torrent. An explosion badly burned three people and she telephoned to Salida for help. A special train was hurried to Howard with a physician on board. The injured were rushed to a hospital, and from reports given out at that place, the three victims owe their lives to the telephone and Miss Beeson's heroism.

For nearly five hours she remained at the switchboard, perched on a high stool, with the water seething through and about the building threatening its destruction. Finally as the flood renewed its fury, the people at the hotel, about 300 yards distant, sent a man on horseback to rescue the young woman. She waded to the door, mounted behind her rescuer, and was carried to the hotel in safety.

This was one of the most destructive floods in the history of upper Arkansas valley, and the telephone, as usual, did its part in saving life and property. Many cases were reported where ranchmen called up their neighbors and warned them that the water was rushing down a certain draw or creek, thereby enabling them to look after stock and other property before the flood arrived.

A Fatal Delay.

Travelers tell weird stories of certain natives of the Far East, among whom it is not infrequent for one to be seized with homicidal frenzy, and "run amuck" through a village, attacking all who are in his path. Ordinarily the telephone is assumed to contribute to the development of the higher tendencies, but there can be no question that at times the inaccuracies and imperfections of service inspire in persons of nervous temperament the most unpleasant emotions.

So far as can be learned, the first instance of a fatal result being attributed to telephonic hysteria occurred a few days ago at South Woodstock, Conn. One C. F. Brunn, thrown into a violently insane rage by his inability to get a response when he attempted to use the telephone, shot his brother and sister and then committed suicide.

While this incident is apparently unique in telephone history, it recalls a story told by Dr. C. J. H. Woodbury, of a young woman at Muncie, Ind., who had some disagreement with a young man caller, and showed him to the door.

Two days later, when the penitent asked her over the telephone if he might resume his calls, she fired three shots into the receiver.

Bell Company May Have to Put Wires Underground in Madison, Wisconsin.

Alderman Mautz of the Madison city council has introduced an ordinance providing for the removal of all telephone, telegraph and electric light poles and wires from State street, a thoroughfare nine blocks long. The change, under the provisions of the ordinance, is to take place in six months, and a minimum fine of $25 is provided for each and every day after the time limit. The matter has been referred to the street committee.

SQUARE DEALING.

The Independents have alone made it possible for the entire population in Indiana to have good telephone service at reasonable rates. They alone have brought telephone service to the farmer as well as the merchant; to the day laborer as well as the banker; to the rural district as well as the city. They have taken great risks and in a hard fought battle won out over the monopoly. They have made telephone business where there was none, and developed large exchanges where few telephones previously existed. They have kept faith with the people and DESERVE YOUR CO-OPERATION.

We owe the Bell nothing. It has fought us at every turn. It annoyed our subscribers with suits on patent infringements. It bought and burned our exchanges. It charged exorbitant rates and refused to extend its service. It denied the community the right to own and operate its own telephone system. It lays tribute upon the public where it has no competition, to cut rates and demoralize the business where there is competition. It hires purchasable men, controls publications and uses its extensive publicity bureau to discredit our securities and belittle our movement. It seeks to break our systems and place our individual exchanges helplessly and hopelessly in its power. To give it any business which our fellow Independents can handle is playing into its hands and pulling our own structure down upon our heads.—*Indiana Independent Telephone Association Bulletin.*

Extensive Improvements at Indianapolis.

Within the past six months the Indianapolis Telephone Company has spent over $100,000 in improving and extending its plant, says a report from that city. This includes a new exchange building, automatic switches, underground and aerial construction on the east side capable of accommodating 2,500 subscribers. The company has also extended and enlarged its equipment on the north side and in North Indianapolis sufficiently to take care of all telephone service required for an indefinite period. A new automatic substation is being constructed in the western part of the city which will now place this company in position to take care of the telephone needs of the entire city.

The company has over 14,000 subscribers connected with its exchange, and is said to be taking new contracts at the rate of 450 to 500 each month.

Factory and Sales

New Stromberg-Carlson Salesman.

The Stromberg-Carlson Telephone Manufacturing Company announces that Mr. C. I. Echols, formerly traveling salesman in West Virginia, Ohio and Pennsylvania for the Century Telephone Construction Company of Buffalo, has

Mr. C. I. Echols.

been appointed as its traveling representative in the state of Texas. Mr. Echols is well acquainted with the methods and equipment of the Stromberg-Carlson company, as he formerly acted as a foreman installer on many of the original common battery installations made by this company. His wide experience in the practical work of installing and as a salesman in many of the growing sections of the country, fits him aptly for the important position which has been assigned to him just recently.

JOHN A. ROEBLING'S SONS COMPANY, Trenton, N. J., has received ten grand prizes, the highest awards, for its exhibit at the Alaska-Yukon-Pacific Exposition. A grand prize was awarded the company for its general exhibit and similar prizes were bestowed for different articles shown. Among the Roebling products thus honored were telephone and telegraph wire and telephone cables.

DUPLEX METALS COMPANY, 149 Broadway, New York, recently issued a circular entitled, "Is Copper-Clad Steel Wire an Experiment?" It shows that many of the leading railroads of the country have purchased considerable quantities of the wire.

Change of Name and Location.

The Stone-Cook Lumber Company, which formerly was located at Northome, Minn., is changing its location to Park Falls, Wis., and the name of the company is now the Park Falls Cedar Company. The officers are: F. P. Stone, Wausau, president; A. L. Stone, Clinton, Ia., vice president and treasurer; S. H. Cook, Park Falls, secretary and manager. The company's intention is to produce and offer to the telephone trade a superior stock of cedar poles. The main office of the company will be at Wausau and the sales office at Park Falls. Its authorized capital is $40,000, of which $25,000 is paid in.

An Automatic Trunk Selecting Device.

An interesting field for development seems to be opened up by the invention of devices for automatically connecting any one of several short local telephone lines to a trunk leading to a distant central office, instead of running several lines the whole distance. A method of accomplishing this which is attracting attention just now is the invention of Aug. A. Monson, an ingenious and practical telephone man of St. Paul, Minn.

The "Automatic Trunker," as Mr. Monson calls his invention, is useful for connecting subscribers located at some distance from central, as in suburbs, outlying villages and rural districts. In any case where it is possible to group telephones together with individual pairs of wires, as shown in the accompanying diagram, Fig. 1, much line material is saved, line maintenance expenses are reduced, and almost inaccessible groups of subscribers can be reached and served privately and selectively, it is claimed, with economy. These results are accomplished by using a single pair of wires connecting the device to the distant central.

The "Trunker," Fig. 2, is mounted on a pole in a galvanized

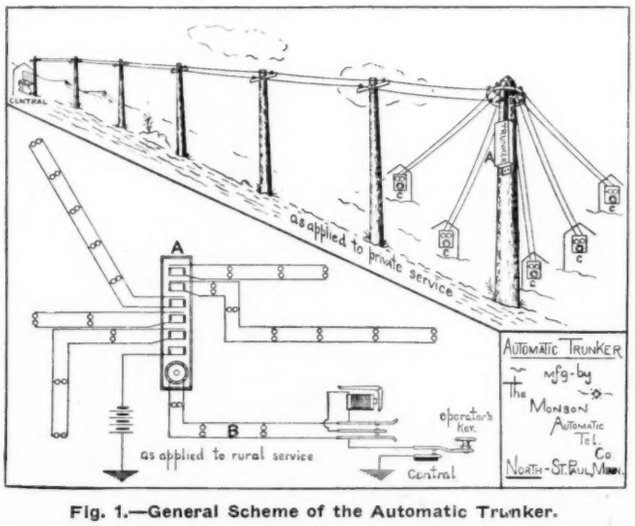


Fig. 1.—General Scheme of the Automatic Trunker.

iron case, like an ordinary terminal head. It consists of a number of relays and a step-by-step selector which is actuated over one of the wires of the trunk line, Fig. 1, by a very simple special key and battery located at the central office.

The "Trunker" includes a relay for each branch line, and one cut-off relay. The telephones, *C, C, C,* at the end of the branch lines are each equipped respectively with a push-button. This is all the extra equipment attached to a telephone. Each branch line consists of a pair of wires connecting the telephone to the "Trunker." However, in rural practice several telephones are installed on each branch line, and they can then ring each other locally, and only use the push-button to secure connection with the distant "Central" and with other branch lines. The "Trunker" is connected to "Central" by a single pair of wires which is called the trunk or main line. It terminates in the jack and drop or signal on the switchboard in the usual way, and is also wired to the special key previously mentioned. No special ringing currents are used, nor any further additions made. The switchboard and telephones used may be of any make.

Note—For individual service the circuit for picking up the relays is closed by the receiver hook in removing the receiver, as shown in Fig. 3.

In operating a party line telephone, the subscriber first presses the button on his telephone. This connects him

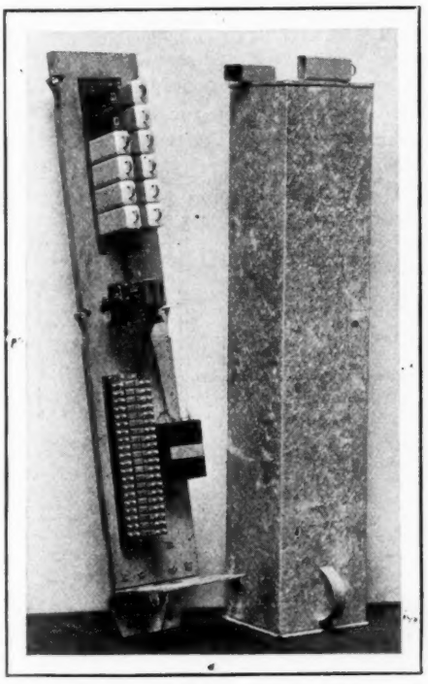


Fig. 2.—Switching Equipment for Ten Local Lines and One Trunk.

through the "Trunker" to the main line and "Central." Next he turns his generator, which signals "Central," in the usual way, and he then secures the desired connection, either in the exchange, on some other trunk line, or in his own group. For connections with telephones in "Trunker" groups, "Central" will use the special key to place the step-by-step selector on the proper branch line and ring out on that line only. When the subscribed first pressed his button for connection with "Central," the cut-off relay locked out all the other branches in the group. When the key is operated at the exchange, the selector connects one of them to the calling subscriber's branch under supervision of the operator, but the other branches in the group are still disconnected. Thus private conversation and selective ringing are rendered possible with ordinary lines and equipment, where there is only one telephone on each branch line. But for rural work it is advantageous to install several telephones on each branch line and also a number on the main line. This is perfectly practical, but of course conversation is no longer private, nor ringing selective, except among the branches. A great advantage is gained, however, in being able to connect at a distance any farm line as a branch. In such cases the "Trunker" is placed on a pole where a number of lines meet, as, for instance, at a cross-road. This does away with plug boards and operators in rural communities.

By means of a number of main lines, branching out at the distant end through "Trunkers," to individual telephones, se-

Mr. Aug. A. Monson.

cret and selective service can be given to an outlying village without a local operator there. The operating would be done for the village by the large exchange where the trunk lines center. In ordinary exchange work these "Trunkers" are placed in any part of town, connected to "Central," and "drops" run to the telephones the same as from any terminal head. Since none of the branches are ever connected to the main line except when in use, and then only one or two at a time, it is clear that a series telephone will do as well as an expensive bridging instrument.

The "Trunker" is also made up so as to be used with common battery systems. In this type no battery is used either at the Trunker or at the telephone as energy is supplied by the central office. It is said that this Trunker will operate with the ordinary type of common battery

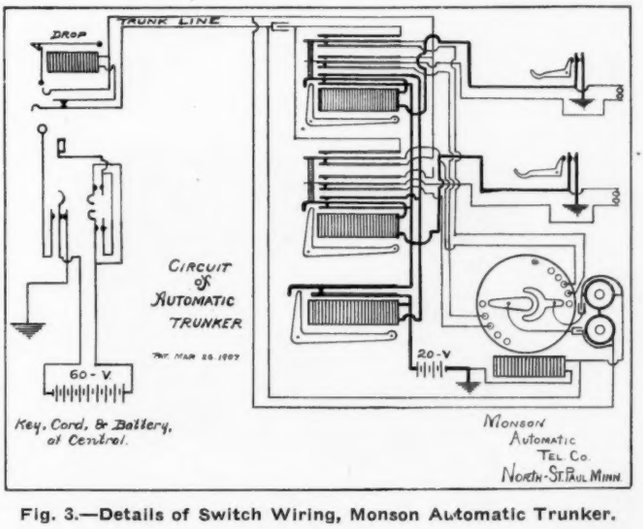


Fig. 3.—Details of Switch Wiring, Monson Automatic Trunker.

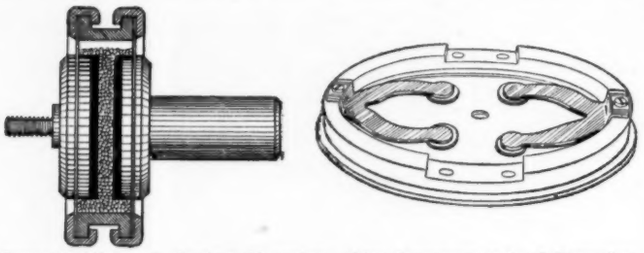
telephone without the addition of any kind of push button, removing the receiver signaling the central office in the usual manner.

The device is manufactured and sold by the Monson Automatic Telephone Co., North St. Paul, Minn.

The New Monarch Transmitter.

Some interesting innovations are made in a new transmitter from the Monarch factory. In discussing the instrument a representative of the company said:

"Owing to the form of the diaphragm its vibrating surface is free from the conditions which would have a damping effect on the operation of this part, and prevent the production of perfectly true tones. The vibrating part of the diaphragm is a plane disc with no formation in its surface, having attached to it only the hub of the carbon chamber, and this at the exact center, where it does not hamper the vibrations, and is in the best position to receive them most effectively.



Cross-Section of Carbon Chamber, Also Arrangement of Damping Springs on Diaphragm.

"Another feature which is instrumental in the production of the improved tone is the method of supporting the diaphragm. This is done in a way that keeps the vibrating surface clear of the front, and avoids the damping effect noticeable where the outer part of the vibrating surface comes in contact with a solid surface. Here a flange is formed at the rim which holds the vibrating surface away from the front. The edge of the flange does not rest against the transmitter front, but has a substantial base sufficiently wide to eliminate harsh tones that would be apparent if the edge alone were the support.

"The rubber gasket insulating the diaphragm is done away with in this transmitter. Rubber is good as long as it is in perfect condition, but in some climates commercial rubber deteriorates rapidly, and in order to aid in making this transmitter indestructible a single piece of linen is used instead and this gasket is treated with a compound which protects it from harmful effects of heat, cold, moisture or other climatic conditions. In this connection it is pointed out that the only metal used in this transmitter, with the exception of a connecting strip and the diaphragm, is brass, and therefore the expansion and contraction is uniform throughout, keeping the transmitter always in adjustment."

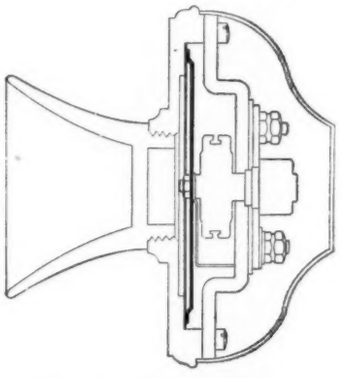
Parts of the New Monarch Transmitter.

The illustrations show that a new design of damper spring is used. These springs are simple, and bring pressure on the diaphragm at points an equal distance from the center and from each other. The effect of this is to distribute the pressure equally over the entire diaphragm, and allow it to vibrate uniformly throughout. This also has its part in producing the quality of tone in the new transmitter.

The carbon chamber is so constructed that it also is unaffected by climatic conditions, for it is built moisture-proof. This carbon chamber is so constructed that the vibrations are not confined to one electrode, but, owing to there being a flexible mica diaphragm at both front and back, the containing walls vibrate also, the purpose being to keep the carbon granules in motion, and preventing their packing.

Connections are brought out to two substantial binding posts on the bridge in a convenient location, as will be seen in the cross-section view. It will also be noticed that the back hub of the carbon chamber passes through a cylinder in the bridge which is provided with a set screw, furnishing a dependable means of adjustment.

Although this transmitter has been on the market but a few weeks, it has attracted considerable attention. It is the product of the Monarch Telephone Manufacturing Company, of Chicago, which, as is well known, formerly made very good transmitters. Notwithstanding this, the company has been working steadily to perfect the new instrument. The Monarch company does not ask telephone men to take anything for granted in regard to this new transmitter, but it invites investigation and asks that this instrument be given a comparative test with others. In order that this can be done conveniently, the company offers to send samples immediately upon receipt of a letter or postal card request.



The Monarch Transmitter.

McIntire Motor Cars are among the vehicles which have attracted special attention from the telephone men, owing to their adaptability to the rugged conditions which a telephone car must overcome. The advance announcement for 1910, just issued by the W. H. McIntire Company, Auburn, Indiana, gives useful pointers to those who wish to keep up-to-date in this branch of the business.

Farr Telephone & Construction Supply Company, Chicago, is pleasing its old friends in the operating field by renewed activity as dealers in telephones, magneto switchboards, batteries, and an elaborate line of construction tools and supplies. The officers are: S. A. Dinsmore, pres.; Geo. E. Lawton, sec.-treas.; and Chas. W. F. Farr. Messrs. Dinsmore and Farr are well known as pioneers in the telephone supply business and are widely esteemed.

The Everstick Anchor Company, St. Louis, Mo., is mailing out a circular illustrating the use of the Everstick Anchor. It also contains several convincing testimonials regarding the efficiency of the anchor.

Condensed News Reports

Officers of companies are earnestly requested to forward us promptly all financial and other statements as soon as issued and any items of interest as to their plants and systems

PERSONAL.

B. E. EOFF has been secured as manager of the Warsaw Telephone Company at Warsaw, Mo.

E. H. LAMER succeeds Warren Greer as manager of the Alamo Home Telephone Company at Alamo, Tenn.

L. W. FIELDING, formerly manager of the Jonesboro, Ark., Home Telephone Company, has resigned to enter the employ of the Automatic Electric Company, Chicago.

JAMES J. C. HATELEY, formerly with the American Telephone & Telegraph Company of St. Louis, is now assistant traffic chief with the same company in Kansas City.

FRED L. BAER has been transferred from the offices of the Home Telephone Company, of Alameda County, Oakland, Cal. to the Home Company of San Francisco as superintendent of equipment.

WILLIAM E. LIGGETT, chief engineer and superintendent, Stantonville Telephone Company, has moved his headquarters to Jackson, Tenn., from which place the auditing and general business of the company will be carried on.

NEW COMPANIES.

DOVER, DEL.—The Sun Telephone & Telegraph Company was chartered at this place to engage in these lines through the country. The incorporators are Terry W. Allen, John F. Wisdom and W. G. Timperlake, all of Jackson, Tenn. The capital stock of the company is placed at $50,000.

TENNYSON, IND.—The Tennyson Mutual Telephone Company has filed articles of incorporation with the Secretary of State. The company is capitalized at $20,000. The object of the corporation is to build an exchange in Tennyson. The directors are W. O. Hendrickson, Charles Pango, C. R. Stephens, F. A. Rhodes, and Forren Hobbs.

CRYSTAL LAKE, IA.—The Britt and Crystal Farmers' Telephone Company, with a capital of $6,000 has been organized by A. O. Christenson, P. G. Anderson, M. J. Barrett, Edward Peterson, J. M. Coller and David Frazer.

IMOGENE, IA.—A town mutual telephone company has been incorporated at this place, with Dr. Allen, as president; M. M. Holbert, secretary; Dr. Baker and Dr. O'Connor, directors.

CHAVIES, KY.—The Chavies Telephone Co. has been organized by Calvin Hall, Sam Patton and William Combs, Sr., with a capital stock of $1,000, for the purpose of building lines to Dwarf and Hazard. Construction work will be begun at once. Calvin Hall is Manager of the new company.

HYDEN, KY.—The Hyden-London Telephone Company has been organized here by W. J. Ford, B. F. Williams and Robert Dixon all of Hayden, with a capital stock of $3,000, for the purpose of building local, independent telephone lines from Hyden to London, 50 miles. Franchises will be secured and the line built this year. W. J. Ford is Manager of the company.

PRESTONBURG, KY.—A new company being organized in this place, by F. S. Harkins and others, with a capital stock of $3,000, is the Floyd County Telephone Company. Lines will be constructed throughout Floyd county.

LANSING, MICH.—The Secretary of State has received articles of incorporation for the Marenisco Telephone Company of Marenisco.

MARQUETTE, MICH.—A new telephone company, known as the Chocolay Telephone Company has been organized. Lines are already built.

ST. PAUL, MINN.—The Vercas Telephone Company, Vercas, with a capital stock of $10,000 was incorporated. W. B. Carman, James Mesbitt and A. G. Schwarzrock are some of the interested parties.

RENO, NEV.—Local people have incorporated the Bannock Telephone & Telegraph Company, and have already commenced the construction of a line connecting Bannock and Battle Mountain.

TRUXTON, N. Y.—The Truxton & Chening Telephone Company is the name of a new company incorporated to construct and maintain telephone lines. The capital stock of the company is $2,000, and the incorporators are A. Risley Muller, William Bell, W. R. Bennett, all of Truxton.

SALEM, ORE.—The Checto Southern Telephone Company is the name of a new company incorporated to do business in this section, with principal place of business at Harbor, Curry County. The capital stock is $5,000 and the incorporators are W. J. Cooley, A. G. Gradiner and Erasmus G. Gradiner.

DURANGO, TEX.—The Durango Telephone Company was recently incorporated by J. H. Cox, G. L. Farmer, T. C. Farmer.

KEYSER, W. VA.—A new company to be known as the Mineral County Mutual Telephone Company was recently incorporated with a $5,000 capital. O. A. Hood and others are the incorporators.

POINT PLEASANT, W. VA.—The Old Town Mutual Telephone Company, recently incorporated with a $5,000 capital stock, will equip and operate rural telephone lines in Mason county. E. S. Riffle, president; Geo. C. Musgrave, secretary, and T. T. Hogg, treasurer, are the incorporators.

VALDEZ, ALASKA.—The Valdez-Fairbanks Long Distance Telephone Company has been formed for the building of a line from Valdez into the interior, terminating at Fairbanks.

REGINA, SASK., CAN.—Notice was given in a recent issue of the Government Gazette of the incorporation of the Glen Ewen Rural Telephone Company, Glen Ewen, Sask.

FINANCIAL.

WINDSOR, MO.—The Missouri Telephone Company will soon issue $25,000 of bonds for extensions and improvements to plant, etc.

NEW YORK CITY, N. Y.—The Keystone Telephone Company of Philadelphia, has applied to the New York Stock Exchange to list $1,443,000 first mortgage 5 per cent bonds, due 1935.

CONSTRUCTION.

WASHINGTON, D. C.—The following was taken from the Daily Consular & Trade Reports of October 16: "A report has been received from an American legation in a Latin-American country, stating that a local telephone system, connecting all important points in the country, would be constructed by a local telephone company. Work will begin on this system, at once, and it is hoped will be completed within two years." Copy of the report containing further particulars about the decree can be obtained by application to the Bureau of Manufactures, referring to file No. 3995.

WASHINGTON, D. C.—A directory of the Venezuela Telephone & Electric Appliances Company, an English concern with $500,000 invested, and reaching numerous towns, with Caracas, Venezuela, as a center, has been forwarded to the Manufactures Bureau by Consul Isaac A. Manning. The manager states that the company will soon begin the installation of metallic circuits on all lines.

This company holds no time concession from the Government, therefore no monopoly of the telephone rights, but a free service is granted the Venezuelan government, and in return is immune from direct taxation, and has the privilege of importation at 50 per cent discount from regular duties.

WASHINGTON, D. C.—An American consular officer in the Levant furnishes the name of a concern that is acting for the local post and telegraph office in the matter of the installation of a telephone system in a city in his district. He suggests that American firms forward at once catalogues and price lists of telephone apparatus, prices of wire, etc.; also the cost of a central exchange for 1,000 subscribers. The firm in question states that it can probably induce the authorized officials of the government to give it the preference, and thus secure the contract to American firms. Further information may be secured from the Manufacturers Bureau, Washington, D. C. referring to number 3942.

CORNING, IA.—The Corning Telephone Company has commenced the reconstruction of its lines. The company will lay about 2,000 feet of cable underground. The work will be completed this fall. This is a local stock company, managed by the principal owner J. A. Anderson, who has given good service at a low rate.

HARLAN, KY.—The Harlan County Telephone Company will begin at once the construction of a line from Harlan via Wallen's Creek, to Hagan, Va., 13 miles. N. H. Green is Manager of the company.

LACKEY, KY.—The Lackey Telephone Company organized here recently by Walter Hoskins and others, with a capital stock of $1,000, will build a local independent telephone line from Lackey via Osborn, to McDowell, Ky., a distance of 17 miles. Walter Hoskins is Manager of the company.

PIKEVILLE, KY.—The Eastern Kentucky Home Telephone Company announces that it will begin at once construction of lines from Pikeville to Mouth of Card, Ky., 18 miles; also a double line will be built to Marline. A. N. Starkley is Manager.

PIKESVILLE, KY.—The Eastern Kentucky Home Telephone Company is negotiating for the purchase of a new switchboard for the Pikeville exchange. Likewise one for the Elkhorn City, Ky., exchange. Address, N. Starkey, manager, Pikeville, Ky.

WHITESBURG, KY.—An Independent telephone line will be built from Stonega to Big Stone Gap, Va., a distance of 12 miles, by the Whitesburg Telephone Company. James P. Lewis, manager of this company, is looking after the purchasing of material and the construction of the line.

BAD AXE, MICH.—The Consolidated Telephone Company with a capital stock of $250,000 was recently organized here, the principal stockholders being A. E. Sleeper, John Ryan and F. W. Hubbard. The company has purchased numerous small exchanges and toll lines in Huron and Sanilac counties and will thoroughly develop this territory and rebuild all existing property.

H. A. Price, until a few months ago, general manager of the Saginaw Valley Telephone Company, of Saginaw, has been secured as General Manager of the new corporation and its development will be under his supervision.

SILVER CITY, N. M.—The Grant County Telephone Company has contracted with the Azure Mining Company to extend its lines to the Azure camp, in the Burro mountains.

PILOT ROCK, ORE.—Word has been received that the negotiations long pending for the sale and reorganization of the Inter State Telephone Company of this city have materialized and the new owners are in charge. The new officers are: W. E. DeLarm, of Seattle, president; R. H. McWhorter, vice-president and general manager; H. N. Benton, of Seattle, secretary and treasurer, while these officers with T. E. McGinitie, of Seattle, and Fred Steiwer, of Pendleton, constitute the board of directors. The company is on a sound financial basis and will at once proceed with numerous extensions of its lines planned for some time. Mr. McWhorter, general manager of the company, is an experienced telephone man, having been connected with numerous Independent companies in the east.

At Harrington, Washington, it is announcd that E. E. Crandall, general manager of the Independent company here, will proceed at once to rebuild the local system.

VOLANT, PA.—The Volant exchange of the Plain Grove Telephone Company will be moved to a more central location, the present location not being central to the business portion of the town.

PORT LAVACA, TEX.—The Port Lavaca Telephone Company is making preparation to extend its lines to Port O'Connor, twenty-five miles down the coast. W. C. Best and Homer Innis, managers, have already inspected the route, and work will be commenced soon and pushed rapidly to completion.

WENATCHEE, WASH.—The Farmers' Telephone & Telegraph Company is installing more apparatus to care for the increase in business. About 1,200 telephones are installed now, and orders are being taken at the rate of more than one a day. This company was organized by ranchers and business men who were opposed to the company operating for various reasons, and the property now owned by this company is valued at $80,000.

TRIDELPHIA, W. VA.—W. A. Jackson, superintendent of construction for the Manufacturers' Heat & Light Company of Pittsburg, stated that his company would soon install a telephone line from this place to Majorsville. He also reports that lines will possibly be built from here to Fairmont, Clarksburg and Lost Creek. It is expected the construction of these lines will consume more than a year's time.

NORWALK, WIS.—A telephone line is being built to Norwalk. This is being done by the Monroe County Telephone Company, which has connections all over the county, and connections are made with Milwaukee, Madison and other large cities.

EDMONTON, ALTA., CAN.—The Alberta Government Telephone system has been connected with adjacent systems in Washington State, making communication possible between this city and Spokane, Wash.

BRANDON, MAN., CAN.—The Canadian Pacific Railroad Company has completed and put into operation a telephone line between Brandon and Cartier, Ont., a distance of 1,044 miles, and is now engaged in stringing several other wires along its main line between Medicine Hat, Alta and Brandon, Man. For the time being this wire will be used entirely for emergency purposes but eventually the company may use it for dispatching trains. Every train traveling between Brandon and Cartier is fitted with apparatus enabling the conductors to communicate with stations from any point along the line. This is the first wire of a system which the company proposes to extend over all its lines between the Atlantic and the Pacific.

FORT WILLIAM, ONT., CAN.—The Slate River Municipal Telephone Company has been connected with the municipal system here.

ELECTIONS.

HOPEDALE, ILL.—At a meeting of the Farmers' Telephone Company, H. J. Uuzicker, H. G. Schneider, J. H. Henderson, W H. B. McCormick and W. M. Mount were elected directors for the ensuing year. The directors elected the following officers: W. M. Mount, president; W. H. B. McCormick, treasurer, secretary and manager.

NEW LONDON, IA.—Stockholders of the Henry County Telephone Company met and elected directors to serve the interests of the company, as follows: W. R. Buchanan, J. T. Laughlin, W. J. Francy, C. P. Johnson, H. G. King, Willis Sater and J. E. Peterson.

PORTLAND, ORE.—Stockholders of the Portland Home Telephone Company, at a recent meeting took up the question of enlarging the directorate, and W. M. Ladd, T. B. Wilcox, Henry L. Corbett, A. L. Mills and Edward Cookingham, prominent capitalists of Portland, were added to the directorate. The company contemplates largely enlarging its sphere of action. The company now has 10,000 telephones connected to its system, and by plans of extension of service, which is expected to be made soon, it is thought the number will probably increase 50 per cent.

MISCELLANEOUS.

FORT SMITH, ARK.—Superintendent LeRoy Kramer of the Central Division of the Frisco Railway system, has devised a means of keeping in direct connection with all points of the division regardless of the fact that he may be out on the road in his private car. All important offices along the road are equipped with telephones and the car carries the regulation field telephone attachment. When he desires to talk with any point along the line connection is made to the wire, and his business can thus be dispatched hurriedly.

STOCKTON, CAL.—Clerk Donohue has received a report of a most remarkable telephone company, which is operating in Webster township. This company has just four subscribers and has an assessed value of $8.00. The name of the company is the Bohemian Mutual Telephone Company. The company boasts of 1½ miles of line and 40 poles. A yearly tax of 41c is paid by this company.

CHIPLEY, FLA.—Messrs. A. G. Scholl and F. H. Knauff, representing northern capitalists, have purchased the telephone exchanges of Chipley and Graceville, Fla., together with 250 miles of toll lines, from Mr. T. J. Watts. Application is being made for a charter for a corporation to be known as the West Florida Telephone Company, with headquarters at Chipley, with a capital stock of $100,000. Material has been purchased for making the line from Chipley to Andrews Bay metallic circuit, and a switchboard has been ordered and an exchange will be built at Panama City. The section around the Bay has a population of over 6,000 people, and is growing rapidly, but has no telephone facilities whatever.

LA CROSSE, KAN.—The Home Telephone Company, of which the Meyer Brothers have the controlling interest, and the Farmer's Telephone Company, and Independent lines traversing the county, have consolidated, the Home company owning the system, and will operate the lines in the future.

BEATRICE, NEB.—The New Home Telephone Company has purchased a controlling interest in the Filley Home Telephone Company.

ALBANY, N. Y.—Theodore M. Brush, Elyria, Ohio, and Perry J. Fitzgerald, manager of the Albany Home Telephone Company, are president and general manager, respectively, of the recently incorporated Public Safety Appliance Company, which will open offices on Howard street and engage in the manufacture of signal and safety appliance for policemen, watchmen and firemen.

ALBANY, N. Y.—The United Message Company, Albany, N. Y., has elected the following directors: James M. Andrews, Schenectady; Theodore M. Brush, Elyria, Ohio; E. M. Brush, Elyria, Ohio; I. R. Coughtry, Albany; T. Henry Dumary, Albany; William C. Geer, Troy; Irving H. Griswold, Elyria, Ohio; B. G. Higley, Sandy Hill; Howard Hendrickson, Albany; W. B. Harris, Albany; H. C. Hequembourg, New York; F. W. Kavanaugh, Waterford; James McNaughton, New York; J. W. Perc, Fremont, Ohio; George D. Smith, Little Falls; R. Stephens, Albany; F. H. Sudre, Elyria, Ohio; Eugene Walrath, Little Falls; J. M. Wever, Plattsburg, and E. M. Woodward, Albany.

CLEVELAND, OHIO.—President E. G. Tillotson of the Cuyahoga Telephone Company reports that since January 1st the company has expended and contracted to expend over $400,000 for permanent improvements and extensions. The money for these expenditures was derived from the sale of collateral trust notes and net earnings; 33 1/3 per cent of the gross earnings has been reserved for maintenance and renewals. Other extensions will be made, it is further reported, as soon as the conditions will permit.

ALINE, OKLA.—The Aline Telephone Company has changed ownership. G. E. Speece purchased the exchange from Messrs. Morgan and Pryor, and will conduct the business hereafter.

BRISTOW, OKLA.—James Ward Owen, who owned the controlling interest of the Bristow Telephone Company, sold his interests to Leeteer Brothers, of Stroud. W. H. Leeteer will go to Bristow and take active charge of the exchange. The new owners have already purchased a certain amount of cable, preliminary to placing the wires of the system in the city in cables.

GUTHRIE, OKLA.—The Corporation Commission has postponed the hearing on the proposed order of the Commission fixing telephone rates in the state, from October 12 until later in the month to give the smaller companies time to prepare data and organize to make a showing against the commission putting the order into effect, if they so desire.

LADYSMITH, WIS.—The headquarters of the Chippewa Valley Telephone Company, formerly located at Bruce, are now in Ladysmith.

LODI, WIS.—The Lodi Telephone Exchange recently increased its rates for business telephones. The charge now made is $1.50 a month for business and $1.00 a month for residence service. Manager Sparks reports that during the past year the company has rebuilt the local system putting in a multiple cable plant.

WAUPUN, WIS.—Since tne local telephone company raised its rates citizens are talking seriously of organizing a local telephone company. Men are canvassing and reports have shown favorably toward the building of an Independent system.